PB80-194236

State Water Resource Planning and Policy in North Carolina

North Carolina Water Resources Research Inst.
Raleigh

Prepared for

Office of Water Research and Technology
Washington, DC

Feb 80

U.S. Department of Commerce
National Technical Information Service
NTIS

PB80-194236

Report No. 143

STATE WATER RESOURCE PLANNING AND POLICY IN NORTH CAROLINA

By

Maynard M. Hufschmidt
Professor
Department of City and Regional Planning
University of North Carolina at Chapel Hill

February 1979

Water Resources Research Institute
OF THE UNIVERSITY OF NORTH CAROLINA

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Raleigh, North Carolina 27650

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BIBLIOGRAPHIC INFORMATION

PB80-194236

State Water Resource Planning and Policy in North Carolina,

Feb 80

Maynard M. Hufschmidt.

PERFORMER: North Carolina Water Resources Research Inst.,
Raleigh.
UNC-WRRI-79-143

SPONSOR: Office of Water Research and Technology,
Washington, DC.
W8005516 OWRTB-103-NC(1)

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KEYWORDS: *Water resources, *Project planning, *North Carolina, *Water management(Applied).

Available from the National Technical Information Service, Springfield, Va. 22161

PRICE CODE: PC A07/MF A01

Selected Water Resources Abstracts
Input Transaction Form

1. Report No.
2.
3. Accession No. W 80-05516

4. Title STATE WATER RESOURCE PLANNING AND POLICY IN NORTH CAROLINA,

5. Report Date
6.
8. Performing Organization Report No.

7. Author(s) Hufschmidt, M. M.

10. Project No. OWRT B-103-NC (1)

9. Organization
North Carolina University, Chapel Hill
Department of City and Regional Planning

11. Contract/Grant No.

12. Sponsoring Organization

13. Type of Report and Period Covered

15. Supplementary Notes Research University of North Carolina, Raleigh Water Resources Institute Report No. UNC-WRRI-79-143, February 1980. 134 p, 7 fig, 7 tab, 36 ref, 2 append.

16. Abstract

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17a. Descriptors

*North Carolina, *Planning, *Future planning (Projected), Administrative agencies, Water resources development, Water quality, State governments, Federal government, Flood control, Sedimentation, Management, Optimum development plans, Land use.

17c. COWRR Field & Group 06E

Available from the National Technical Information Service as PB80 194236

18. Availability [redacted]

19. Security Class. (Report)
20. Security Class. (Page)
21. No. of Pages 133
22. Price A07/A01

Send to:
Water Resources Scientific Information Center
OFFICE OF WATER RESEARCH AND TECHNOLOGY
U.S. DEPARTMENT OF THE INTERIOR
Washington, D.C. 20240

Abstractor S. Seigler
Institution Information Planning Associates, Inc.

UNC-WRRI-79-143

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The work upon which this publication is based was supported in part by funds provided by the Office of Water Research and Technology, U.S. Department of the Interior, Washington, D.C., through the Water Resources Research Institute of the University of North Carolina as authorized by the Water Research and Development Act of 1978.

Project No. B-103-NC
Agreement No. 14-34-0001-7175

February 1980

Contents of this publication do not necessarily reflect the views and policies of the Office of Water Research and Technology, U.S. Department of the Interior, nor does mention of trade names or commercial products constitute their endorsement or recommendation for use by the U.S. Government.

ACKNOWLEDGMENT

The study upon which this report is based was started in July 1976 and was essentially completed by September 1978. A large number of people contributed to the study and the report in one way or another and it is not possible to acknowledge all of these contributions in this brief note.

Stephen M. Murphy served ably as my research assistant during the first year of the study. He undertook much background research on North Carolina State water law, programs and policy which provided a good basis for much of the later analyses. Marian Orfeo served as a research assistant from August through December, 1977. During this period she prepared a background paper on the recent history of water resource planning in North Carolina, which served as a basis for Chapter II of the report, and contributed an analysis of State flood management law.

Patricia Stevens made extremely important contributions to the project as a research assistant during the period September 1977-September 1978. She prepared a background paper on current North Carolina water supply planning and related activities, and collaborated with me on preparation of a paper on the administrative system for water management in North Carolina which was presented at the Southeast Conference on Legal and Administrative Systems for Water Allocation held in Blacksburg, Virginia in April 1978. In addition, Ms. Stevens was primarily responsible for collecting background information from agencies of the State government and for undertaking most of the detailed analyses of legislative, administrative, program, and budgetery information shown in Chapter III of the report. Her total contribution to the study and the report is very great and I am extremely indebted to her for this.

My colleague in the Department of City and Regional Planning, Professor David H. Moreau, contributed a background paper to the study on water quality planning in North Carolina, which provides the basis for much of the material on water quality planning in the report. Also, Professor Milton Heath of the

Institute of Government gave valuable cooperation and support to the study, especially on legal and policy aspects.

This study and report would not have been possible without the cooperation of many officials of State government. In particular, John Wray, currently Chief of the Water Planning and Development Section, Division of Environmental Management, Department of Natural Resources and Community Development, and John Morris, currently Director of the Office of Water Resources, Department of Natural Resources and Community Development, have made valuable contributions. They have supported the research from the start and have provided much information and valuable criticism. Anne Taylor, currently Director, Office of Regulatory Relations, Department of Natural Resources and Community Development, provided valuable help and encouragement in the later phases of the study.

Others in State and Federal governments who provided valuable information and cooperated in other ways include:

Ralph Heath, U.S. Geological Survey, Raleigh Office

Earl Long, Wilmington, N.C. District, U.S. Army Corps of Engineers

A.F. McRorie, former Director, Division of Environmental Management, Department of Natural Resources and Community Development

Marshall Staton, Chief, Sanitary Engineering Section, Division of Health Services, Department of Human Resources

John Sutherland, Water Planning and Development Section, Division of Environmental Management, Department of Natural Resources and Community Development

R.W. Van Tilburg, Chief, Environmental Planning Section, Division of Environmental Management, Department of Natural Resources and Community Development

A special debt of gratitude is owed to the leadership and staff of the N.C. Water Resources Research Institute. David Howells, former Director of the Institute, was primarily responsible for motivating the author to undertake the study and has been a consistent supporter of the work throughout.

James Stewart, currently Acting Director, provided guidance and support in disseminating the results of the study to officials of State government. Neil Grigg, current Director of the Institute on leave as Assistant Secretary for Natural Resources, Department of Natural Resources and Community Development, has consistently supported and encouraged the work since his arrival in North Carolina in 1977.

Finally, a very special debt is owed to Asta Cooper, who provided administrative assistance throughout the period and who typed the various drafts of the manuscript and handled final editing and arrangements for reproduction of the report. I also express my appreciation to the library and administrative and secretarial staffs of the Department of City and Regional Planning.

ABSTRACT

The objective of the report is to examine the current status of State water resource planning and policy development in North Carolina and to suggest specific changes in organization, programs, methods and funding that would lead toward improved water planning and management directed toward meeting future needs.

The report presents a brief historical review of State water resource planning for the 1965-1975 decade. The current (1976-1978) setting for State water resource management is then analyzed in terms of the legislative basis and program content of State water resource activities, the organizational structure for water resource planning and management, and the linkages of State programs and activities with those of the Federal government. The program content of State water resource planning is then examined, including comprehensive planning, water quality planning, coastal area planning, and other specialized kinds of planning including small watershed, fish and wildlife, and water supply.

The planning activity is then analyzed in terms of the appropriate role of planning in an overall State management and policy development process. A set of criteria for evaluating the State's water resource planning performance is set forth, and applied to the State's activities as of 1976-1978.

A proposed strategy for water resource planning is presented, including suggestions for changes in organization and administration, program content, and methodology. Finally, general and specific conclusions and recommendations for early and long-term action are presented.

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TABLE OF CONTENTS

Page

ACKNOWLEDGEMENT iii

ABSTRACT. vii

LIST OF TABLES. xi

LIST OF FIGURES xii

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS. 1
- Conclusions 1
  - In General 1
  - Specific 1
  - On Planning. 2
- Recommendations 2
  - In General 2
  - On Organization. 2
  - On Programs. 3
  - On Planning. 3

I. INTRODUCTION 5

II. HISTORICAL BACKGROUND. 9

III. THE CURRENT SETTING. 31
- Introduction. 31
- Classification of State Activities. 32
  - Water Supply 32
  - Water Quality. 38
  - Flood Damage Reduction 40
  - Erosion and Sedimentation. 40
  - Land Drainage. 41
  - Navigation 42
  - Hydroelectric Power. 42
  - Recreation 42
  - Fish and Wildlife. 43
  - Protection of Areas of Environmental Concern 43
  - Overall Water Resource Management. 43
- Organizational Structure. 44
  - Department of Natural Resources and Community Development. 47
  - Department of Human Resources. 53
- Federal Agency Linkages 55
- State Water Resource Expenditures 62
- State Water Resource Planning 65
  - The Planning Program 65
  - Public Participation 68
  - Basic Planning Data. 69
  - Related Water Resource Planning. 69
  - Summary on Water Resource Planning 73

Preceding page blank

Page

IV. ANALYTICAL APPROACH. 75
Criteria for Effective Planning 81
A. Relating to the Output of the Planning Activity. . 82
B. Relating to Use of Planning Outputs. 82
C. Relating to the Processes Used in Planning 83
D. Relating to Organization for Planning. 84
General Findings. 85
Specific Findings 89
A. Outputs of the Planning Activity 89
B. Use of Planning Outputs. 90
C. Planning Processes 91
D. Organization for Planning. 92

V. A PROPOSED STRATEGY FOR WATER RESOURCE PLANNING IN NORTH CAROLINA 95
Organization and Administration 95
Program of Planning 96
Planning Methodology. 99
Procedure for Carrying Out a Strategy 100

VI. CONCLUSIONS AND RECOMMENDATIONS. 103
Conclusions 103
General Conclusions. 103
Specific Program Conclusions 104
Conclusions on Planning. 106
Recommendations 106
General Recommendations. 106
Recommendations on Organization. 107
Programmatic Recommendations 108
Recommendations on Planning. 109

BIBLIOGRAPHY. 113

APPENDIX 1. NORTH CAROLINA WATER PLAN--PROGRESS REPORT SERIES: FINAL REPORT ON STATUS; and N.C. WATER PLAN CONTROL OUTLINE 117

APPENDIX 2. CHANGING ORGANIZATIONAL LOCATION OF THE NORTH CAROLINA STATE WATER RESOURCE PLANNING FUNCTION, 1968-1977. 123

LIST OF TABLES

Page

III-1. SUMMARY OF NORTH CAROLINA STATE LEGISLATION RELATING TO MANAGEMENT OF WATER AND RELATED LAND RESOURCES AS OF JUNE 1978 33

III-2. SIGNIFICANT WATER AND RELATED LAND RESOURCE MANAGEMENT ACTIVITIES OF THE STATE OF NORTH CAROLINA, BY PRINCIPAL ELEMENTS, 1978 37

III-3. WATER RESOURCE MANAGEMENT ACTIVITIES, STATE OF NORTH CAROLINA, BY MAJOR ELEMENT AND GOVERNMENT ORGANIZATION 46

III-4. MAJOR FEDERAL WATER RESOURCE PROGRAMS, CLASSIFIED BY MAJOR ELEMENTS AND AGENCY, SHOWING THE PRIMARY STATE AGENCY OR AGENCIES INVOLVED. 56

III-5. SUMMARY OF FUNDING FOR NORTH CAROLINA STATE WATER AND RELATED LAND RESOURCE MANAGEMENT, BY ORGANIZATIONAL UNIT AND ACTIVITY, FISCAL YEAR, 1970-1978. 63

III-6. NORTH CAROLINA STATE EXPENDITURES FOR WATER RESOURCE BASIC DATA, PLANNING AND REGULATION. 64

III-7. MAJOR WATER RESOURCE PLANNING AND BASIC DATA PROGRAMS, STATE OF NORTH CAROLINA, FISCAL YEAR 1978. 72

LIST OF FIGURES

Page

I-1. STATE OF NORTH CAROLINA: THE DEPARTMENT OF WATER RESOURCES. 11

I-2. DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES. COMBINED MANAGEMENT AND STATUTORY AUTHORITY 21

III-1. ORGANIZATION OF EXECUTIVE BRANCH, STATE OF NORTH CAROLINA, 1978, SHOWING MAJOR AND MINOR WATER RESOURCE ACTIVITIES. 45

III-2. ORGANIZATION OF DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, 1978, SHOWING MAJOR AND RELATED WATER RESOURCE ACTIVITIES AND RESPONSIBILITIES 48

III-3. ORGANIZATION OF NATURAL RESOURCE ACTIVITIES IN THE DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, 1978, SHOWING THE FLOW OF POLICY AND ADMINISTRATION AMONG ADMINISTRATIVE UNITS AND POLICY AND ADVISORY COMMISSIONS, COMMITTEES, COUNCILS AND BOARDS. 49

III-4. ORGANIZATION OF THE DIVISION OF ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, SEPTEMBER 1978. 51

III-5. ORGANIZATION OF SANITARY ENGINEERING SECTION, DEPARTMENT OF HUMAN RESOURCES, 1978, SHOWING MAJOR WATER RESOURCE AND RELATED ACTIVITIES 55

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

An extensive listing and discussion of conclusions and recommendations is to be found in Chapter VI of the report. These conclusions and recommendations are based on a detailed study of the North Carolina State water resource planning activity, including its legislative and policy basis, history, organization and administration, and substantive content. This study, carried out over a two-year period from mid-1976 to mid-1978, included interviews with key State and Federal officials and detailed analysis of voluminous documentation on legislation, and administrative, organizational, program and budgetary materials. From the results of these analyses and discussion of their implications for policy and administration with many key individuals in and out of State government, the conclusions and recommendations of Chapter VI were developed. A summary of them is presented here.

Conclusions

In General

North Carolina water management is in a state of transition and has not yet matured so as to reflect an appropriate balance between water quantity and quality aspects. The distorting Federal government influence characterized by strong pressures for water pollution control continues, to the detriment of other important water resource problems and needs. There is need for much greater State leadership and capability for overall water management. Existing State resources are not effectively mobilized, but are diffused in the Departments of Natural Resources and Community Development and Human Resources.

Specific

Water quantity management, including allocation of water among competing resources, is the most important unresolved water management issue. Water allocation laws are deficient and administration of the existing "Capacity-

Use Law" is faulty. Greater attention needs to be given to interstate water management problems, flood management, and sedimentation control. A vigorous State water conservation program is also needed.

On Planning

Progress in comprehensive water resource planning has not kept pace with State needs; only water quality planning is adequately supported. Although the State government has recently recognized these deficiencies, additional State resources need to be applied if the State is to take maximum advantage of the probably forthcoming increased Federal support for comprehensive planning. In particular, statewide planning for flood management, water supply and conservation and interstate water issues need increasing attention.

Recommendations

In General

A major restudy of existing water allocation law should be undertaken and corrective alternatives should be developed. New legislation is needed on protection of in-stream uses, policy for trans-basin diversions, and authorization and guidance for interstate cooperation. The Floodway Regulation Act and Sedimentation Control Act should be strengthened. Legislation to establish new State cost-sharing policies for water resources projects should be enacted.

On Organization

A strong State water management unit should be established in the Department of Natural Resources and Community Development, either as a separate Water Resources Division or as a major sub-unit in the Division of Environmental Management. Transfer of the major water management activities now in the Department of Human resources should be given further consideration; pending such a transfer, strong coordination should be achieved via an interagency group with DNRCD leadership.

On Programs

The State should act now to establish a new water quantity management program, combining policy, planning, basic data and regulatory aspects. It should strengthen and expand its interstate water management activities, its flood management program, and its sedimentation control program, and it should establish a new water conservation program. The State should take these actions in advance of the enactment of new legislation.

On Planning

Organization. Major planning capability should be placed in a central water resource planning staff with lead responsibility for all major aspects of water resource planning. This should be supplemented by a small policy and planning staff at the departmental level and specialized planning staffs for individual program areas. Special attention is needed to coordinate the currently large water quality planning program with comprehensive water resource planning.

Program Content. A program of water resource planning, viewed as an aid to water management, should include: statewide water resource assessment of supply and demand, conducted every three or four years; a statewide framework-type report on policy-problem-program alternatives, kept up-to-date; major sub-regional planning studies by river basin and metropolitan areas, to be completed statewide within ten years; statewide single-purpose studies such as the statewide 208 water quality study, and studies of local navigation, small watersheds and other projects, as needed.

Methodology. State water resource planning should be based on the scientific method and principles of rationality, should be multi-objective in approach, and should emphasize sound economic and environmental analysis and systems techniques. It should be innovative and should emphasize adaptation of these approaches to the situation in North Carolina. Public participation in planning and linkage of planning to implementation should be emphasized. Strong links should also be built with planning in other sectors of State government and with local, regional and Federal government agencies.

Procedures. The DNRCD and the Governor should propose, and the Legislature should consider, improvements in water resource legislation in the 1980 and 1981 Legislative sessions. The DNRCD should promptly develop and seek approval of specific programs and budgets for the new and expanded activities in water resource management, flood management, sedimentation control, and water conservation. It should also develop and seek approval of an expanded program and budget for planning to take advantage of likely availability of increased Federal grants for comprehensive water resource planning. Finally, a study should be made in 1981 of experience with the water resource organizational and management structure established in 1978 and 1979.

CHAPTER I

INTRODUCTION

An important recommendation of the Senate Select Committee on National Water Resources (1961) was that State leadership and planning of water resources be strengthened. This recommendation was an important factor in the enactment of Title III of the Federal Water Resources Planning Act of 1965 (Public Law 89-90), which authorized grants to States for comprehensive water resource planning. With this Federal stimulus, North Carolina established a program of State water resource planning as a part of an expanded Department of Water Resources (later the Department of Water and Air Resources). As discussed in detail in Chapter II, the State's water resource planning and management program was severely affected by (1) major reorganization of State government in 1972, involving the placement of water resource activities in a newly-created Department of Natural Resources, and (2) the impact on the State of the Federal Water Pollution Control Act Amendments of 1972, with strong emphasis on water pollution control, buttressed by Federal planning and construction grants, and by Federal regulations on effluents.

The unintended results of these actions were unfortunate for the water resource program. By 1975, as a result of successive reorganizations, the administration of water resource activities was diffused in several different offices in the Department of Natural and Economic Resources. Furthermore, comprehensive water resource planning was seriously underfunded and understaffed in relation to needs, and the State was encountering serious difficulties in dealing with emerging water crises associated with major ground water withdrawals on the Coastal Plain and allocation of surface waters for water supply and electric power generation.

This situation led water resource experts in and out of State government, including the director and staff of the N.C. Water Resources Research Institute, to propose rexamination of the question of effective State water resource management, including an examination of the adequacy of State programs and administrative structure in relation to the emerging needs.

This study of State water resource planning in North Carolina was undertaken as one response to these proposals for reexamination. The study objectives and design were formulated in the fall of 1975, and work began on the study in July 1976. Key State and Federal water resource officials were interviewed in July and August, 1976, and work was begun on collection and analysis of data on State water resource legislation, organizational structure and administrative procedures, programs and budgets. As an aid to the analyses, a classification scheme was developed, consisting of eleven major water resource programs and nine management sub-activities, as described in detail in Chapter III.

In early 1977, a set of tentative evaluation criteria was developed to assess the State's water resource planning activity. These tentative criteria were submitted to a number of water resource specialists in the State and Federal governments and the universities, and a set of final criteria was developed to serve the evaluation purpose. These criteria are set forth in Chapter IV.

A tentative statement of desirable content and form of a State water resource planning activity (Hufschmidt, 1977) was presented at a Planning Seminar on the proposed Yadkin-Pee Dee Level B study held in Greensboro in June 1977. This statement was discussed further in interviews with State and Federal water resource experts in June and July, 1977.

Intensive analysis of the collected documentation and the results of interviews proceeded during the period June 1977-May 1978. Background papers were prepared on water quality planning in North Carolina (Moreau, 1977); historical review of water resource planning in North Carolina (Orfeo, 1977a); and current water supply planning in North Carolina (Stevens, 1977). In addition, a special analysis was made of the administrative system for water management in North Carolina (Hufschmidt and Stevens, 1978) for presentation at the Southeast Conference on Legal and Administrative Systems for Water Allocation held at Blacksburg, Virginia in April 1978.

In June 1978 a preliminary draft of the final report of the study was presented at a meeting of State and Federal water resource experts and other interested officials, and detailed comments and suggestions for revision were solicited. These have been taken into account in preparing the final report including findings and recommendations.

Background research for this project was carried on until September 1978, and the information on organizational and administrative structure and programs is valid as of September 1978, unless indicated otherwise.

Chapter II presents a historical summary that provides the background for the situation that existed with respect to State water resource planning when the study was begun in July 1976. In Chapter III, the current (1977-1978) setting is developed with respect to water resource legislation, organizational structure, Federal-State linkages, and programs and budgets for water resource planning. Chapter IV presents the essence of the analysis including a discussion of the role of the State in water management, presentation of the set of evaluative criteria, and application of these criteria to develop sets of general and specific findings on State water resource planning. Chapter V presents the outlines of a proposed general strategy for State water resource management, which follows from the findings of Chapter III. From this general strategy, findings and recommendations are presented in summary form in Chapter VI.

CHAPTER II

HISTORICAL BACKGROUND

Modern water resource planning and development history in North Carolina begins after World War II. The first concern was with the quality of the State's waters. A State Stream Sanitation and Conservation Committee established in 1945 reported in 1946 on the first comprehensive assessment of wastewater discharges in the State (SSSCC, Pollution Survey Report, 1946). This was followed in 1951 by enactment of the State Stream Sanitation Law (G.S.143-21), the first comprehensive pollution control legislation to be passed in the State. The law authorized creation of the State Stream Sanitation Committee as an autonomous body administratively located in the State Board of Health. This Committee undertook the development of a pollution abatement program for the State's waters consisting of four major elements:

1. development of water quality standards for each of several classifications of stream segments where those classifications reflect the intended use of stream segments;
2. surveys of existing pollution and water quality in each major river basin in the State and the formulation of recommendations as to how each stream segment in the basin was to be classified;
3. assignment of classifications and related water quality standards to each stream segment according to the "best use" of each segment; and
4. formulation of comprehensive pollution abatement plans based on the stream classification and water quality standards.

This simple and straightforward strategy was completed in 12 years during which surveys, stream classifications and abatement plans were completed and adopted for 15 river basins with complete geographical coverage of the State. Furthermore, during this period 335 waste-treatment projects costing approximately $118 million were initiated and 16 other projects were approved for construction (Heath and Godschalk, 1964, p. 69).

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Also, in the early 1950s comprehensive, multiple-purpose water resource planning was beginning to be recognized as a distinct and identifiable functional process, although as yet no attempt had been made to make it operational. This early recognition has been attributed in part to a reform movement directed at North Carolina water rights law. The need for reform of the basic structure of riparianism was apparent in many Eastern states. A sustained drought which plagued the entire Southeast was another factor which emphasized the need to overhaul the riparian doctrine in North Carolina (Heath and Godschalk, 1964, pp. 106-107).

The reform urge in North Carolina was ultimately channelled into the creation in 1955 of the State Board of Water Commissioners, a continuing body charged with the study of State water policy (Heath and Godschalk, 1964, p. 106). In 1959, this Board was merged with other water resource agencies into a Department of Water Resources (DWR) as a result of the enactment of the Department of Water Resources Act (G.S.143.39). Two policy-making bodies were included in the Department: the State Stream Sanitation Committee (SSSC) was transferred from the State Board of Health and a new Board of Water Resources (BWR) was established. The Act also transferred the Division of Water Pollution Control, the administrative arm of the SSSC since 1957, to the new Department. The BWR was authorized to assign new duties to the Division and to change its title to reflect any change in responsibility. Accordingly, the Board added the surface water flow measurement program and a surface and ground water quality investigation program to the Division and established a new Division of Stream Sanitation and Hydrology. The Board also established three other divisions: Navigable Waterways, Staff Services, and Ground Water. The Board had thought it advisable to create a Division of Research and Planning, but due to budgetary constraints and a compelling need for the ground water study in the eyes of the Board, the Division of Research and Planning was dropped in favor of a Division on Ground Water (Heath and Godschalk, 1964, p. 37). Figure I-1 presents an organizational chart of the agency as of 1959.

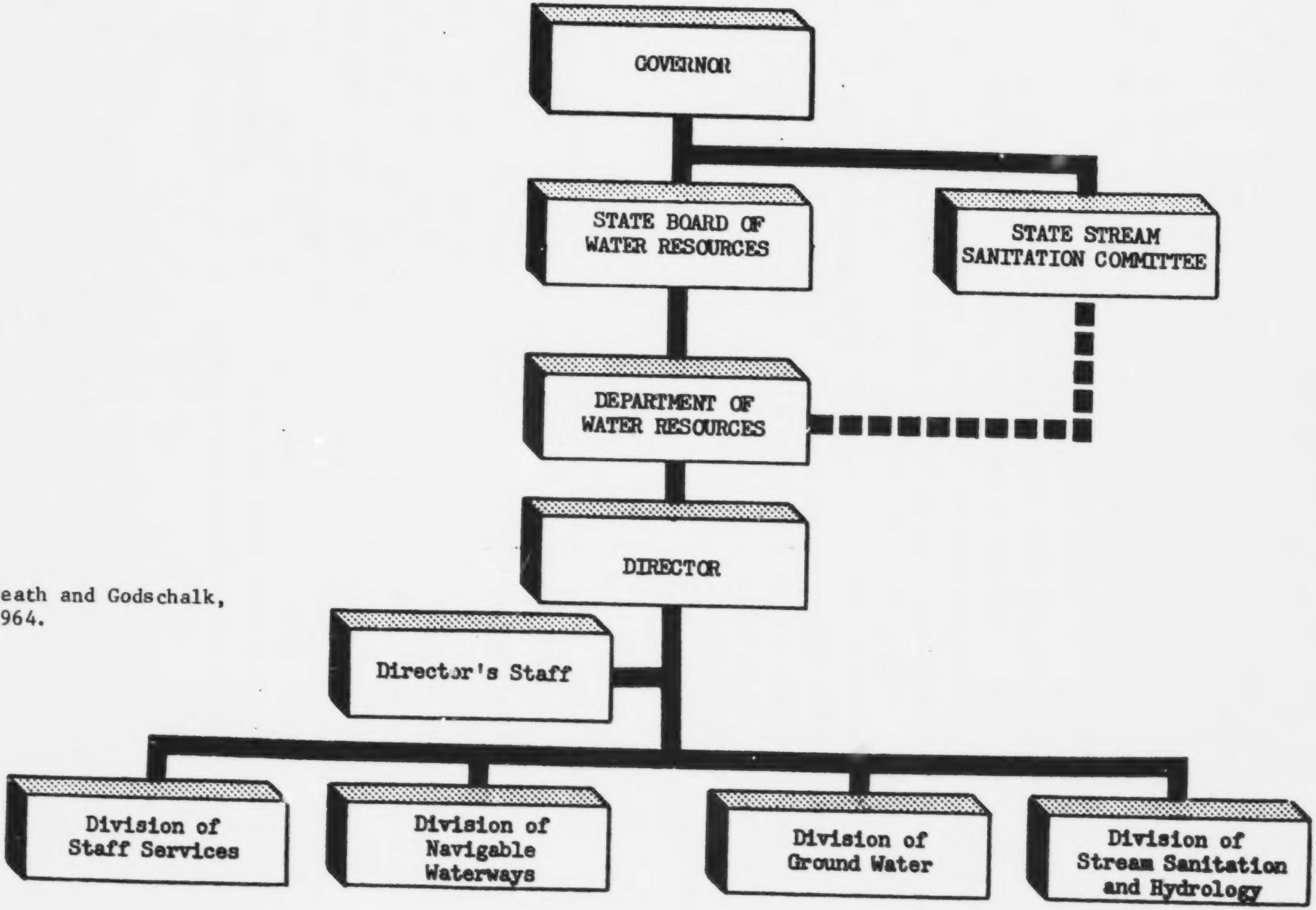
The Act thus recognized the need for centralizing and coordinating the water resource programs within a single State agency, and for the development of a common framework through which to administer State agency plans and

FIGURE I-1

STATE OF NORTH CAROLINA

THE DEPARTMENT OF WATER RESOURCES

1959


GOVERNOR
STATE BOARD OF WATER RESOURCES
STATE STREAM SANITATION COMMITTEE
DEPARTMENT OF WATER RESOURCES
DIRECTOR
Director's Staff
Division of Staff Services
Division of Navigable Waterways
Division of Ground Water
Division of Stream Sanitation and Hydrology

Source: Heath and Godschalk, 1964.

coordinate Federal agency plans (DWR, 1966, p. 80). Specifically, the Act direcred the Department to prepare a comprehensive State water plan under the supervision of the Board and the Committee.

Nonetheless, the water resource planning function continued to be carried out as it had been before the enactment of the Department of Water Resources Act--in the Department's words, "as an adjunct of the programs of individual divisions, departments, and agencies" [emphasis added] (Heath and Godschalk, 1964, p. 42). This was the conclusion of the first investigation of water resource planning in the State, which appeared in 1964, entitled appropriately, Water Resource Planning in North Carolina. Prepared for the DWR by Milton Heath and David Godschalk of the Institute of Government of the University of North Carolina, the study reported that only in the fields of water pollution abatement, ground water and flood control did the Department appear to have a strong planning element.

With the enactment of the Department of Water Resources Act came the realization that the groundwork for the development of a centralized water resource planning program needed to be laid, despite the lack of an overall State framework plan (Heath and Godschalk, 1964, p. 190). Two other factors were also working to hasten this development (Heath and Godschalk, 1964, p. 143). One was the notion of "multi-purpose use" for the design of water resource construction and development projects. The other was the recognition of the need to consider the regional impacts of water resource programs through the "basin wide development" approach. Both concepts, which were developed and refined by the TVA and national water resource agencies such as the Soil Conservation Service and the Corps of Engineers, serve to illustrate the interplay between various water resource programs and highlight the need for their formal coordination.

The Department had already given some thought as to what a comprehensive water resource planning program should include. The Department defined six functions:

1. policy statement;
2. liaison with an interdepartmental committee;
3. data collection and analysis;
4. project review and coordination;
5. determination of future water needs; and
6. research. (Heath and Godschalk, 1964, p. 172)

The goal of the Planning Division would be the formulation of a comprehensive water resource plan. This would involve, according to the Department:

1. setting basic planning objectives;
2. enunciating a companion set of State water resource policies;
3. formulating a physical plan;
5. establishing priorities for development; and
6. devising a capital budget. (Heath and Godschalk, 1964, p. 172)

To carry out the planning function, the Department proposed a

> two-pronged organization...to ensure close internal coordination between the planners and the operating division of the Department of Water Resources. The Planning Division itself will be a small, high caliber staff unit under the Director of the Department. A Department Planning Committee, made up of the Director and the Division Heads, will act as a formal communications body to ensure that the work of the planning unit is effectively related to the ongoing programs of the Department. (Heath and Godschalk, 1964, p. 195)

By the time the Heath-Godschalk study was published in July 1964, a new Planning Division had already been established and had assumed operation. For administrative and budgetary purposes, it was placed in the Office of the Director (DWR, 1966, p. 71). Only one professional employee was permanently assigned to the Division and it remained at this size until 1968. According to the Fourth Biennial Report of the DWR, water resource planning during that time (April 1, 1964-June 30, 1966) included "advice and assistance to other State agencies, visits to local communities, spot studies of particular areas of interest, and answering requests from the public for information" (DWR, 1966, p. 73). By the end of the period, the Division had also completed a four-volume loose-leaf planning survey of the State by subject, river basin, and region.

The Fourth Biennial Report also introduced the concept of a State water resource plan as a discrete document. Frequent reference is made in the Report to the "North Carolina Water Plan." The Department thought of the plan as

> long-range and broadly conceived...to meet the overall needs of the State, to include proper consideration for all of the competing user interests, and the viewpoints of all shades of professional environmental interests. Such a plan must incorporate the contributions of all the divisions within the Department. (DWR, 1966, p. 79)

At the outset of the two-year period, the Department recognized that it would have to set definite goals and concentrate its attention on achieving them if progress on the water resource plan was to be realized. That significant progress was not made was blamed on "diverted effort and sheer lack of manpower" (DWR, 1966, p. 72). The Department also pointed out that the long delay in setting up a planning organization resulted in lost opportunities for exerting leadership in a newly-organized State Planning Task Force.[1]

However, events were taking place on the national scene which would significantly alter the course of state water resource planning in North Carolina. The biennium saw unprecedented Federal activity in response to Congressional attention to water resource matters. This concern was spurred as a result of a new emphasis on the larger issue of environmental quality. In the water resource field, statutes set up new standards and approaches and broader conceptions of water resource management and development, including closely related matters of land resources (DWR, 1966, p. 75). Some of the more important laws included:

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[1] Organized in the Department of Administration shortly after the Sanford Administration took office in 1961 and after the results of an inderdepartmental study concluded that State planning activities could be expanded, the Task Force was composed of a nucleus of staff within the Department of Administration and formal representatives from the planning staffs of all appropriate State agencies. The DWR representative, the Chief of the Planning Division, sat on three Task Force Subcommittees: Recreation, Land Improvement, and Water Resources.

- Land and Water Conservation Fund Act of 1965 (9/3/64)
- Appalachian Redevelopment Act of 1965 (3/9/65)
- Water Projects Recreation Act (7/9/65)
- Water Resources Planning Act (7/22/65)
- Housing and Urban Development Act of 1965 (8/10/65)
- Expansion of Saline Water Conversion Program (8/11/65)
- Public Works and Economic Development Act of 1965 (8/26/65)
- Water Quality Act of 1965 (10/2/65)
- Rural Water Systems Development (10/7/65)
- Expansion of Watershed Protection and Flood Prevention Act (11/8/65)

(Source: DWR, 1966, p. 75)

From the standpoint of water resource planning in North Carolina, the most important new piece of legislation was the 1965 Water Resources Planning Act.

The enactment of the Act represented "the culmination of a national movement for comprehensive and coordinated water planning" (Ingram, Bradley and Ingersoll, 1973, p. 110). The Act set up a ten-year grant program to the States for that purpose. Specifically, the Title III grant program (so-called because the program was authorized in Title III of the Act) was aimed at improving the State's contribution to the water resource planning process: "The grant program was intended to encourage increased State participation in Federal-state comprehensive water and related land planning; to aid State preparation of plans in light of regional and national plans and programs for the development and use of a State's water and related land resources; to promote State training of personnel; and, where necessary, to develop additional technical planning capability" (Ingram et al., 1973, p. 1).

Title III was a very important political tool in achieving the support of the States for the Act. Thus, as Ingram et al. point out, it is not surprising that the Water Resources Council (WRC) was not mandated to exercise sanctions in the allocation of the grants. The ability of the Council to penalize the States is constrained by the allocation scheme--a 60 percent "formula" portion based on population, land area, and financial need, and a 40 percent "need" portion based on the State's need for comprehensive water planning programs. The only allocation power which the WRC received in relation to States under Title III was "the power of gentle persuasion" (Ingram et al., 1973, pp. 36-37).

However, the rules and regulations adopted by the WRC in relation to in-state coordination were extremely detailed. State applications for Title III grants were required to assure that "in carrying out the State water and related land resources planning program, consideration will be given to relationships to other planning by the State or other governmental entities within the State with the view of attaining consistency among the several planning programs" (Ingram et al., 1973, p. 116). States were required to show that Title III planning had been specifically coordinated with nine other Federal programs affecting States.[2]

As stated above, one of the aims of the Title III grant program was to aid the States in preparing comprehensive water resource plans. However, there were no strict guidelines as to what constitutes a plan. All the State had to do to qualify for an award was to have its annual program approved. As defined in Part 703.2(M) of the regulations, a program means

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[2] Five of these programs were comprehensive statewide planning programs. They were funded under:

1. Section 701 of the Housing Act of 1954, as amended;
2. The Land and Water Conservation Fund Act of 1965;
3. Sections 314(a) and 314(b) of the Comprehensive Health Planning and Public Health Service Amendments of 1966;
4. Section 206 of the Solid Waste Disposal Act; and
5. Sections 105 and 106 of the Clean Air Act.

The other programs requiring coordination with Title III were:

6. Water pollution control programs in the State, including those conducted pursuant to the Federal Water Pollution Control Act, as amended, and those developed by the Environmental Protection Agency as part of comprehensive, coordinated, joint plans for river basins done in accordance with Section 201(b)(2) of the Act and as authorized by other acts;
7. Comprehenive water and related land resources planning relating to economic development planning conducted within the State in accordance with Titles III, IV, and V of the Public Works and Economic Development Act of 1965 and in accordance with Section 206 of the Appalachian Regional Development Act of 1965;
8. Comprehensive planning for the development of water and sewer systems in rural areas under the Consolidated Farmers Home Administration Act of 1961, as amended; and
9. Research done under the Water Resources Research Act of 1965.

(As cited in Ingram et al., 1973, p. 130)

> ...a coordinated set of planning activities, designed to accomplish the best use, development, management, control, conservation, and preservation of the water and related land resources of a State in accordance with the criteria in Section 303 of the Act.[3] A program may be divided into elements, based on geography, political subdivisions, or kind of development, and may include appropriate administration and training of personnel (Ingram et al., 1973, p. 45).

An important administrative change in the organizational structure of North Carolina water resource agencies came about as a result of action by the 1967 legislature consolidating the BWR and the SSSC into a unified State Board of Water and Air Resources (BWAR). (The DWR accordingly became the DWAR.) The Board was charged with administering water resources and water and air pollution programs. This change probably came about in part because of the State's desire to place the responsibility for implementing Federal water and air pollution legislation within the jurisdiction of a single agency.

Another administrative change of note took place before this consolidation: the transfer of the administrative functions of the N.C. Seashore Commission to the DWR which were then carried on to the DWAR. Sometime later, a separate Marine Sciences Council was established by Governor Dan K. Moore, and ratified by the House and Senate in June of 1967. No overlap in function was intended; rather DWAR and the Council were to have separate scopes of interest. The Council was concerned with the sea and margins of the sea while DWAR focused on the preservation, development, and wise use of water resources from the landward side. Some overlap had occurred, however, in the coastal zone (DWAR, 1971a, p. 74).

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[3] Section 303 reads, in part:

> The Council shall approve any program for comprehensive water and related land resources planning which is submitted by a state, if such program--
>
> (1) provides for comprehensive planning with respect to intra-state or interstate water resources, ...with adequate provision for coordination with all Federal, state and local agencies, and non-governmental entities having responsibilities in affected fields;
>
> (2) provides, where comprehensive statewide development planning is being carried on...for full coordination between comprehensive water resources planning and other statewide planning programs and for assurances that such water resources planning will be in conformity with the general development policy in such State.

(As cited in Ingram et al., 1973, pp. 44-45.)

Since the late 1960s the Coastal Zone has continued to receive much attention as a focus of planning in recognition of its unique management problems. In addition to supporting the continuing work of the Marine Sciences Council, the 1960 General Assembly directed the Commissioner of Commercial and Sport Fisheries to undertake a study of the Coastal Zone "with a view to the preparation of a comprehensive and enforceable plan for the conservation of the resources of the estuaries, the development of their shorelines, and the use of the Coastal Zone of North Carolina." The Commissioner was ordered to prepare an interim report by January 1, 1971, and a final report by November 1, 1973 (DWAR, 1971a, p. 77). The DWAR expressed whole-hearted support of the General Assembly-directed study "since the content is largely germane to the Department mission and the resulting decisions will facilitate progress on the North Carolina Water Plan" (DWAR, 1971a, p. 79).

State water resource legislation was also subject to evaluation during this time. The 1967 General Assembly directed the Legislative Research Commission to study water legislation enacted by that Assembly in order to determine whether changes were needed. A February 1969 report of the Commission's subcommittee on water resources stated that the time that had elapsed since the 1967 General Assembly was insufficient to justify making changes in the law. Later that year the General Assembly directed the Commission to study the need for legislation concerning (1) the revision and recodification of drainage and small watershed laws; (2) local and regional water supplies; (3) the legal framework for delivery of stored water; and (4) other legislation concerning water and air resources as the Commission deems appropriate (DWAR, 1971a, pp. 63-64). Subcommittee reports addressed to these topics were later issued.

A BWAR statement reflecting the Board's policy on environmental quality was released in October 1970. The statement in particular addressed the failure of municipalities to plan for urban growth and development and, as a result, their inability to provide for pollution control. However, the Board took the occasion to assess its own performance capability for safeguarding environmental quality in light of its legislative mandates. It instructed the DWAR

> to institute immediately a study of its policies and procedures in order to determine if it is performing its duties at maximum efficiency within its existing powers. If it appears that present powers are not adequate to carry out the legislative mandate, the Board will recommend additional legislation to the next General Assembly. (DWAR, 1971a, p. 84)

The Department later concluded, with a focus on the upcoming governmental reorganization, that the changes required included:

> 1. Internal streamlining and staff increases along with greater reliance upon modern data processing capabilities.
>
> 2. Transfer of certain administrative and regulatory functions of an administrative nature from the Board to the Department, leaving the Board more in the position of a policy-making body with quasi-judicial functions. (DWAR, 1971a, p. 113)

The Department also felt that the most efficient functional arrangement would be to retain the present powers, functions, and staff "as a single cohesive entity within the major agency to which it may be assigned in State government reorganization"(DWAR, 1971a, p. 114). Moreover, the Department reiterated the need for a management engineering study that it had expressed in its October 1970 policy statement.

The year 1971 was a landmark for water and related land resource legislation. The significant laws included:

- Reorganization of State Government
- Council on State Goals and Policy
- Change in Composition of BWAR
- Constitutional Amendment to Provide for the Protection of Natural Resources
- Environmental Policy Act
- Environmental Impact of Proposed New Industry
- Interstate Environmental Compact
- Mining Act of 1971
- An Act to Protect and Conserve Oil and Gas Resources
- Revision of Small Watershed law
- Provision of Rights of Withdrawal of Impounded Waters

- Beach Erosion Control and Protection of Coastal Areas
- Control of Water and Air Pollution and Management and Conservation of Water Resources
- Regulation of Pesticides
- An Act Establishing Basis for Formation of Metropolitan Water Districts
- Authorization of County Pollution Abatement and Industrial Financing Authorities
- Regional Water and Sewerage Systems
- Additional Authority for the Board of Health Regarding Public Water Supplies
- Water and Sewer Bond Election Act
- Falls of the Neuse Project

(as cited in N.C. Dept.of Natural and Economic Resources, 1972, pp. 3-10.)

For purposes of this discussion, the most important new piece of legislation was the Executive Organization Act. Seventeen major departments were established. Each departmental Secretary was given a mandate to report to the Governor by March 1, 1973 his recommendations for further legislation "to effectuate statutory functions, promote efficiency, and economy" (DNER, 1972, p. 3). Moreover, each department was expected to file a management plan and an annual report each year. Figure I-2 shows the new organizational arrangement of the new Department of Natural and Economic Resources.

As a result of the reorganization, the DWAR was transferred to the new Department of Natural and Economic Resources (DNER) and renamed the Office of Water and Air Resources. Most of the major water resource activities were allocated to DNER. Other departments with significant water resource responsibilities included:

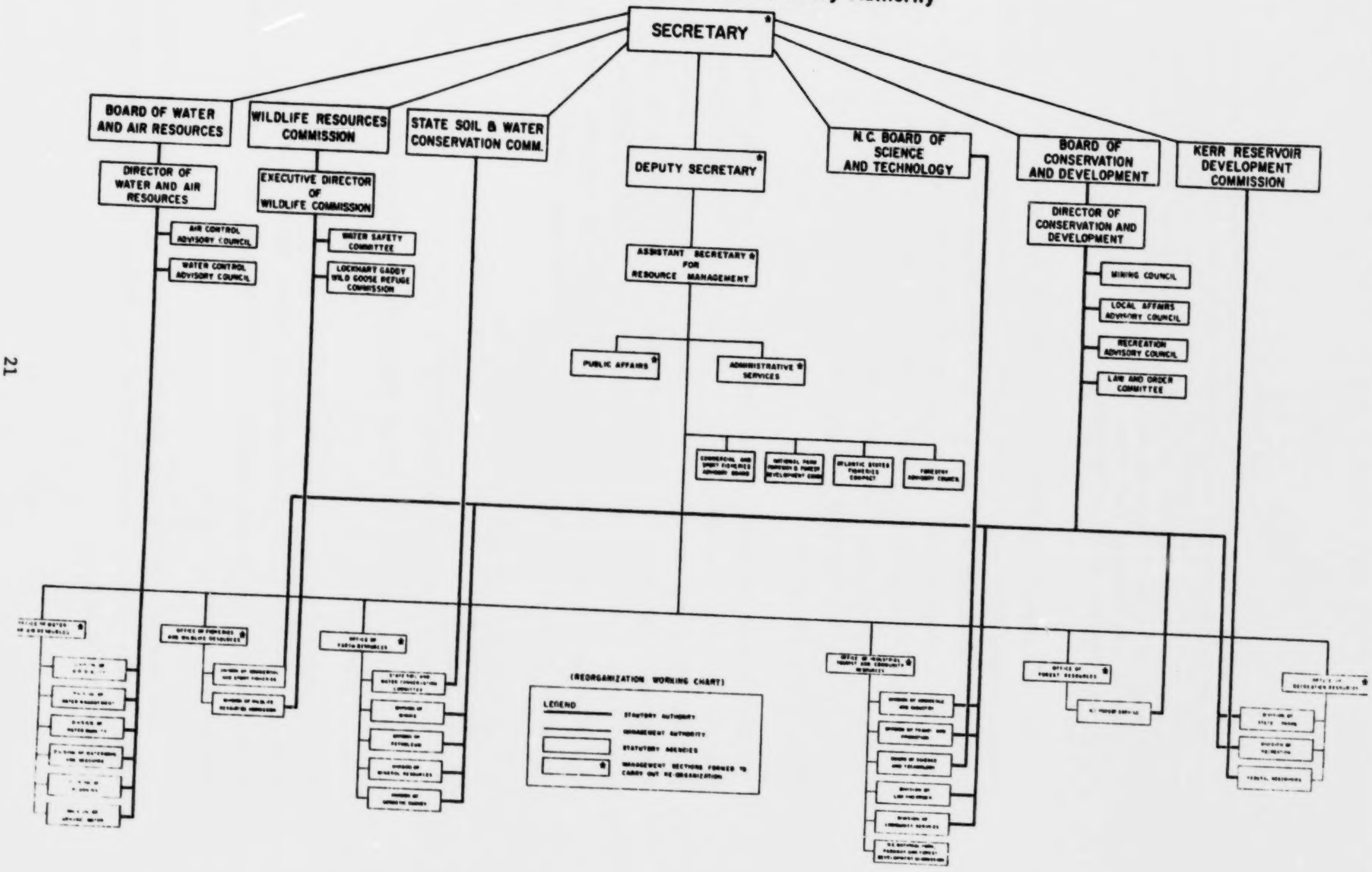
Administration - State Planning Division, Marine Sciences Council;
Human Resources- Sanitary Engineering Division;
Commerce - Utilities Commission.

However, the bulk of the coordination activity rested within DNER. Thomas G. Harton, Chief of the Planning Division of the Office of Water and Air Resources, stated that

FIGURE I-2

Source: DNER, 1972.

DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES
Combined Management and Statutory Authority


SECRETARY *
BOARD OF WATER AND AIR RESOURCES
DIRECTOR OF WATER AND AIR RESOURCES
AIR CONTROL ADVISORY COUNCIL
WATER CONTROL ADVISORY COUNCIL
WILDLIFE RESOURCES COMMISSION
EXECUTIVE DIRECTOR OF WILDLIFE COMMISSION
WATER SAFETY COMMITTEE
LOCKHART GADDY WILD GOOSE REFUGE COMMISSION
STATE SOIL & WATER CONSERVATION COMM.
DEPUTY SECRETARY *
ASSISTANT SECRETARY * FOR RESOURCE MANAGEMENT
PUBLIC AFFAIRS *
ADMINISTRATIVE * SERVICES
COMMERCIAL AND SPORT FISHERIES ADVISORY BOARD
NATIONAL PARK PARKWAY & FOREST DEVELOPMENT COMM.
ATLANTIC STATES FISHERIES COMPACT
FORESTRY ADVISORY COUNCIL
N.C. BOARD OF SCIENCE AND TECHNOLOGY
BOARD OF CONSERVATION AND DEVELOPMENT
DIRECTOR OF CONSERVATION AND DEVELOPMENT
MINING COUNCIL
LOCAL AFFAIRS ADVISORY COUNCIL
RECREATION ADVISORY COUNCIL
LAW AND ORDER COMMITTEE
KERR RESERVOIR DEVELOPMENT COMMISSION
OFFICE OF WATER AND AIR RESOURCES *
OFFICE OF FISHERIES AND WILDLIFE RESOURCES *
DIVISION OF COMMERCIAL AND SPORT FISHERIES
OFFICE OF EARTH RESOURCES *
STATE SOIL AND WATER CONSERVATION COMMITTEE
DIVISION OF MINERAL RESOURCES
DIVISION OF GEODETIC SURVEY
OFFICE OF INDUSTRIAL, TOURIST AND COMMUNITY RESOURCES *
DIVISION OF COMMERCE AND INDUSTRY
DIVISION OF TRAVEL AND PROMOTION
DIVISION OF SCIENCE AND TECHNOLOGY
DIVISION OF LAW ENFORCEMENT
DIVISION OF COMMUNITY SERVICES
N.C. NATIONAL PARK, PARKWAY AND FOREST DEVELOPMENT COMMISSION
OFFICE OF FOREST RESOURCES *
N.C. FOREST SERVICE
OFFICE OF RECREATION RESOURCES *
DIVISION OF STATE PARKS
DIVISION OF RECREATION
(REORGANIZATION WORKING CHART)
LEGEND
STATUTORY AUTHORITY
MANAGEMENT AUTHORITY
STATUTORY AGENCIES
MANAGEMENT SECTIONS FORMED TO CARRY OUT RE-ORGANIZATION

> ...it appears that nearly all water resources management problems can be handled within the Department along with frequent collaboration with the State Planning Division and Sanitary Engineering Division. Less frequent collaboration is required with the others. A powerful tool for coordination exists within the Department of Natural and Economic Resources through the Executive Committee... It is composed of the directors of the six offices. (DNER, 1972, p. 11)

The 1971 semi-annual report for the period ending June 30, 1971, described Planning Division activities prior to the reorganization. The Planning Division had attained full divisional status--that is, it no longer operated as part of the Office of the Director--and had a staff size of eight (Ingram et al., 1973, p. 8). Its work was identified in the report as comprising four activities: (1) Administration; (2) Planning Data Activity; (3) Planning Liaison; and (4) North Carolina Water Plan (DWAR, 1971c, pp. 1-17).

In the years following 1966, the preparation of the N.C. Water Plan received an increasing amount of attention from the Planning Division staff. The first broad outline of the plan appeared in October 1967. It consisted of three stages, including "Phase 1" and "Phase 2" reports prior to the publication of the final plan. By July 1968, the concept was modified somewhat into the idea of preparing as soon as possible an "abbreviated technical progress report" in place of the Phase 1 report. This was later defined to include:

1. present status of development;
2. problems;
3. needs;
4. reports and literature available;
5. studies in progress;
6. extent to which solutions have already been adopted.

   (DWAR, 1971c, p. 22)

By June 1970 the concept of a progress report was well established. To be written in sections, each section of the report was to represent a chapter, first issued in draft form subject to revision based on criticisms, comments, and new developments.

The schedule for the Plan was still listed in three stages in February 1971. George Pickett, the Director of the DWAR at the time, described the content of the stages:

1. Progress Report. A summation of water resources planning in progress, problems, development, adopted plans, and other information. The Progress Report is being issued in draft form initially, and is to be edited and published in final form thereafter. This is to facilitate obtaining meaningful criticism and to make possible the incorporation of the suggestions in the Progress Report.

2. N. C. Water Plan (in sections), Stage 1. A comprehensive planning report insofar as practicable which includes contributions from various sources without necessarily resolving all the conflicts or overlaps.

3. N. C. Water Plan (in sections), Stage 2. A comprehensive planning report representing a consensus or a decision by the State Administration as to choices between alternatives or conflicts. This report becomes the adopted North Carolina Water Plan subject to continuing evolution with formal change as needs warrant. (DWAR, 1971a, cover letter).

However, some time later that same year the Planning Division realized that the costs involved in such an approach might be prohibitive. In its 1972 grant application for Title III funds, the Division stated that Stage 1 of the NCWP should be scheduled to follow the Progress Report (DNER, 1973).

The Progress Report and the NCWP to follow were to be organized into five parts: I. An Introduction and Summary; II. Water Policy, Institutions and Management, consisting of seven chapters; III. Functional Aspects of Water Resource Use and Development, 21 chapters covering major water resource elements such as flood management, soil conservation and water quality; IV. Water Resource Comprehensive Planning Units, consisting of an introductory chapter on the concept of river basin and regional reports, 18 chapters covering North Carolina river basins, plus seven chapters covering other regions such as Appalachia, the Piedmont, and Coastal Zone regions of North Carolina; and V. Appendix, consisting of six specialized sections. The contents of the Progress Report as finally determined are shown in Appendix 1 to this report.

The first draft chapters of the Progress Report appeared in 1970. By the end of the year six draft chapters had been completed. In 1971, three additional reports were published, followed by three additional chapters in

1972. In 1973, five additional reports were completed, followed by two in 1974. At the end of 1974, when production of the Progress Report ceased, only 15 of the 61 chapters of the Progress Report had been published, while four completed chapters were unpublished but available in the open files of the Division.

Also to be incorporated into the Progress Report and the Plan were a series of up-dated long-range, basin-wide pollution control plans. The series of 15 river basin pollution survey reports and pollution abatement plans completed by 1963 had become outmoded by events. As a result of "ensuing changes in public attitude, Federal and State law, and the growing problem of preserving water quality," the plans had to be revised (DWAR, 1971c, p. 20). In particular, the new rules and regulations regarding grants for water pollution control published in June 1970 by the then Federal Water Quality Administration required that construction grants to the States for wastewater collection and treatment facilities be made contingent upon a showing that the proposed project was consistent with basin-wide and metropolitan or regional comprehensive plans. Interim plans were allowed to be used prior to July 1, 1973, with the stipulation that thereafter grant awards were to be subject to consistency with specified basin and regional plans. The Planning Division and the Water Quality Division of DWAR established a "modus operandi" for the interim plans and arranged to collaborate on development of an approach to accomplish the more detailed and comprehensive regulations. Nine interim water quality management plans for sub-basins were completed in 1971, 15 in 1972, and seven in 1973, for a total of 31 plans.

One of the problems with plan preparation that was expressed by the DWAR in 1971 was the lack of "public participation and interest" (DWAR, 1971c, p. 10). The "absolute necessity" of gaining this participation was stressed at the annual meeting of the Interstate Conference on Water Problems in 1971. The difficulty and costliness of gaining this participation was also noted; however, this point was tempered by the view that non-involvement of the public could obviously spell a plan's defeat, regardless of its excellence or need (DWAR, 1971c, p. 10).

Another problem with the water resource planning process voiced by the Department in 1971 was the lack of an interagency committee to oversee plan formulation. The fact that multiple water or water-related studies were being undertaken or promoted by other State agencies necessitated the creation of such a committee. The committee would act as a coordinating mechanism for incorporating such studies in the plan and would also seek to ensure cooperative agency performance. Although the State Planning Officer seemed favorably disposed, the Director of the Department of Administration felt that the governmental reorganization process which culminated in establishing the DNER in 1971 justified holding off on the committee proposal. The Department disagreed, but the convening of the General Assembly at the time impeded the Department's ability to convene the people necessary to explore the matter further.

A cooperative body, the North Carolina Water Plan Coordinating Committee (NCWPCC), was later formed and held its first meeting in May 1972. Its functions were:

1. [To] Promote the completion and continuing maintenance of the North Carolina Water Plan.
2. [To] Provide an advisory body to assess progress, to review the content, and to make recommendations to the Secretary of Natural and Economic Resources.
3. [To] Carry on coordinating activities to assure full participation by those Agencies and individuals who can and should have content to offer.
4. [To] Consider and seek resolution of conflicts on the use of water resources.
5. [To] Recommend measures to assure public participation in the planning process.
6. [To] Perform other tasks that may be directed by the Secretary.

(Memo to Members, NCWPCC, 1974)

Although this Committee held a number of meetings in the ensuing two years, primarily to formulate a proposed State policy on stream channelization, by late 1974 it had become dormant.

An outside view of the planning process involved in the preparation of the NCWP as it was affected by Title III planning grants was provided by Helen Ingram, Michael D. Bradley and David L. Ingersoll in a report on Title III planning grants to States prepared for the Water Resources Council and published in October 1973 (Ingram et al., 1973). The researchers first pointed out the lack of consensus among water resource planners "as to what constitutes a plan or how to relate planning documents to concrete actions" (Ingram et al., 1973, p. 66). Moreover, they conceded that the Council's emphasis on "concrete accomplishments, leading to a statewide plan" may have caused a preoccupation among some States "with the gathering of basic data and the formation of complex, sometimes multi-volume documents" (Ingram et al., 1973, p. 67). The Chief of the Planning Division indicated as much in a paper prepared for delivery at the April 1972 meeting of the Southeast Basin Inter-Agency Committee when he stated: "Very possibly the current series of North Carolina Water Plan-Draft Progress Reports can be characterized as more nearly 'inventory' than 'water plan'" (DNER, 1972, p. 15).

The researchers further characterized North Carolina's process as "a conservative, straight-line projection approach" (Ingram et al., 1973, p. 69).

> North Carolina has concentrated on general data collection with a view to projecting the statewide water needs into the future. This is a more usual, standard planning process. The result eventually, presumably in 1975, will be a formal statewide planning document. The trade-off in this kind of standard planning is the failure to be immediately relevant to emerging needs. Further, there is no special, in-depth knowledge of critical problem areas. (Ingram et al., 1973, p. 74)

However, the researchers place North Carolina in their category of "institution-building states" which encompass those States not having a so-called water plan or "well developed State capability" but who nonetheless perceived the need for an increased capability and at the same time "were determined to overcome Federal dominance in water development"(Ingram et al., 1973, p. 78). Title III provided important financial resources for leadership in these States. In 1971, Governor Scott gave North Carolina's view of the importance of Title III funds:

> In 1965 when the Act was passed, the State of North Carolina had a fair number of employees in several agencies working on some phases of water resources planning, usually fundamental investigative work or special current planning related to specific activities... Only one professional employee in the whole State government was charged with the eventual development of a comprehensive North Carolina Water Plan.
>
> The first Title III funds were made available to our office of Water and Air Resources shortly before July 1, 1968. In the four years that have passed the total staff dedicated to long-range comprehensive water resources planning has grown to 11, over 1500 pages of 23 units of working type draft reports have been distributed for comment, a technical reference library has been assembled containing over 500 items largely related to North Carolina Water Resources, and a very much increased level of participation in Federal planning has resulted...
>
> Directly as a result of Title III grant support, we are in the early stages of a solid, long-term water resources planning program that will be indispensable to our goal for comprehensive State environmental and development planning.
>
> (Letter from Governor Scott to W. Don Maughan, as cited in Ingram et al., 1973, pp. 87-88)

The two-year period of 1972-1973 was critical for water resource planning in North Carolina. On the national front, the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) made sweeping changes in water pollution control policy, planning and management. Included were requirements for major water quality planning programs by States and localities under Sections 201, 208, and 303(e), supported by substantial Federal planning grants, in some cases on a 100 percent basis. This Federal emphasis on water quality planning operated to shift State priorities away from comprehensive water resource planning.

On the State front, the reorganization of State government establishing the Department of Natural and Economic Resources (DNER) and placing the water and air resources activities within the Department brought new challenges as well as opportunities to the leadership of the Office of Water and Air Resources.

Also, in January 1973 a new Republican administration assumed leadership in Raleigh, providing the basis for major changes in administration of State government.

The new Secretary of the DNER soon found that the major output of the water resource planning activity--the partially completed 61 volume Progress Report--did not meet his needs. Accordingly, in August 1973, he directed that a new approach be taken, by calling for preparation within 12 to 18 months of a "practical, realistic, usable" water resource development plan that would be sufficiently specific and comprehensive to enable him and the Governor to weigh the relative consequences of specific project proposals and management measures on a statewide basis. Work on the Progress Report would be terminated, and completion of the State Water Plan was further deferred (DNER, 1974b, 1974c).

Also, in mid-1973, George E. Pickett, the long-time Director of OWAR, retired and was replaced by E.C. Hubbard, the Assistant Director who had been the long-time head of the water pollution control division of OWAR. The new director placed greater emphasis on responding to the Federal requirements for water quality planning.

As a consequence of these changes and others associated with establishing the DNER as an integrated administrative unit, there followed a period of uncertainty and reduced emphasis on the water resource planning activity. Basin-wide water quality planning, as required under Section 303(e) of Public Law 92-500, was made the sole responsibility of the Water Quality Division of OWAR, in effect severing the link between comprehensive water resource planning and water quality planning which had previously existed.

In mid-1974 Thomas Harton, Director of the Water Resource Planning Section, retired. Also, as a part of a major reorganization of DNER, water resource planning was transferred to a new Division of Resource Planning and Evaluation (DRPE), while water quality planning, along with other water quality and air quality activities, were assigned to a new Division of Environmental Management, which replaced the OWAR. The rationale for the establishment of DRPE was to provide a focus for overall natural resource planning and evaluation including land and mineral resources and outdoor recreation as well as surface and ground water resources (DNER, 1974b).

The program direction in water resource planning began to take shape in mid-1974. In addition to the earlier decision to prepare a "practical" short-range development plan, the Division of Environmental Management was to complete the Section 303(e) basin-wide water quality plans by January 1, 1976. Also, the Secretary of DNER requested Federal support from the Water Resources Council for a cooperative Level B study for the entire State, to be completed by January 1, 1978. Finally, the completion of the official North Carolina Water Resources Plan would be deferred until after completion of the proposed Level B plan (DNER, 1974d, p. 203).

Problems of reorganization and staffing during 1973 and 1974 impaired the effectiveness of the planning activity. Although a new planning work program had been developed, six new planning staff positions had been authorized in April 1974, and a large Federal grant of almost $1.3 million had been requested for Level B planning, the resources available for comprehensive water resource planning actually decreased. As of early 1975, four professional and two non-professional staff positions authorized for planning were being used for other Departmental activities, representing a diversion of about $65,000 of a total fiscal year 1975 planning budget of $324,000 (DNER, 1975a).

In summary, by early 1975 the water resource planning activity was emerging from a series of major changes, both external and internal over a three-year period. Major reorganization had abolished the Department of Water and Air Resources and reconstituted it as a Division of Environmental Management in a new Department of Natural and Economic Resources. Overall water resource planning had been placed in a new Division of Resource Planning and Evaluation, thus effectively cutting the administrative link with the water quality planning function in the Division of Environmental Management. (In August 1976, the water resource planning activity was shifted again, this time to the Division of Environmental Management; see Appendix 2 for a summary of these changes from 1968 to 1977.)

In terms of program content, the prior emphasis of the planning staff on preparing a comprehensive N.C. Water Plan in stages began to change in 1973 toward shorter-range planning; in 1974 emphasis was placed on preparing a "water resource reference manual" (completed in the fall of 1974) although some work was still being done on preparing river basin studies for the Tar and Neuse basins. Thus by early 1975, the planning program consisted of:

1. Preparation of a policy and problem oriented water resources Framework Study to be completed by December 1, 1976.

2. Undertaking a cooperative Federal-State Level B study of the entire State, to be completed by Janaury 1, 1978.

3. Deferall of completion of the comprehensive State Water Plan until Fiscal Year 1981. (DNER, 1975a, 1975b)

In terms of program emphasis, the hopes that the comprehensive planning activity would be significantly strengthened by increased funding from State and Federal governments were not realized. After a period of uncertainty in 1973, six new State-funded positions were approved in April 1974. Because these positions were used for other purposes in DNER, the total permanent staff of the planning activity actually decreased slightly during this period, from 16 as of June 20, 1973 to 13 as of June 30, 1974 and 15 as of June 30, 1975.

By mid-1975, comprehensive water resource planning and management occupied a low priority in North Carolina State government. Spurred by Federal programs such as NEPA, Public Law 92-500 and the Coastal Zone Management Act, environmental quality, including water quality management, and environmental aspects of natural resources and land use represented the major emphases. This was the situation immediately before this study of North Carolina water resource planning was undertaken--the study which is the basis for the following chapters of this report.

CHAPTER III

THE CURRENT SETTING

Introduction

Water resource management is a shared responsibility of the three levels of government in the United States. Historically, the Federal government has played a major role in water resource planning and development, beginning with promotion of navigation but now extending to almost all aspects of water resource data collection, planning, development, regulation, and management. Local governments--cities, counties, special-purpose districts--have borne the major responsibility for providing domestic water supply, collecting and treating wastewater, providing urban storm drainage, and regulating land uses for flood management.

State responsibilities for water resource management have developed historically as intermediate activities supplementing those of the Federal and local governments. For example, regulation of water supplies and wastewater systems for public health, and allocation of scarce ground and surface waters among competing uses became recognized early as valid State responsibilities. Statewide basic data programs and water resource planning gained increasing recognition. In recent years, primarily under stimulus of Federal environment and natural resource programs, State water and related land resource management responsibilities have expanded to include many new activities such as flood management, sedimentation control, and coastal zone land-water management. Yet, in North Carolina, the coverage of important elements is not complete, still reflecting the historic intermediate role of the State. The analysis that follows reflects the partial nature of the State role.

Classification of State Activities

This brief analysis of North Carolina water resource activities divides the domain of water resources into eleven principal program elements and nine management sub-activities, closely patterned after a classification scheme developed by the U.S. Water Resources Council (1975). The analysis begins with a listing of major North Carolina State water resource legislation, by Title and Citation, according to the eleven principal program elements. This listing is contained in Table III-1. Each major element is then analyzed briefly in terms of the nine management sub-activities. A summary of this analysis is shown in Table III-2 and the details are presented below.

Water Supply

Historically the major State role in water supply has been to protect the healthfulness of public water supplies used for drinking and household purposes. This is accomplished through regulation of the location, construction, and operation of public water supplies (G.S. 130-157 thru 166). Since enactment of the U.S. Safe Drinking Water Act of 1974 (P.L. 93-523), State regulatory authority and consequent activity has expanded significantly both in coverage of public systems and degree of control to meet the stringent Federal requirements. In terms of our sub-management categories, this State responsibility is carried out through issuing Policies and Guidelines, through Review and Comment of local construction and management plans, and through direct Regulation.

The State has also assumed a supportive and guidance role in the planning and development of local water supplies, especially on a regional basis. Local agencies are given authority to establish sanitary districts, metropolitan water districts, and water and sewer authorities (G.S. 130-12; 162A-1 thru 19 and 31 thru 58). The planning of regional water supplies by local agencies is encouraged through Financial Aid and Technical Assistance for planning (G.S. 162A-20 thru 25). State construction grants of up to 30 percent of project costs were first authorized under the Clean Water Bond Act of 1971, and continued under the Clean Water Bond Act of 1977 approved

TABLE III-1. SUMMARY OF NORTH CAROLINA STATE LEGISLATION RELATING TO MANAGEMENT OF WATER AND RELATED LAND RESOURCES AS OF JUNE, 1978

Major Element and Subelement	Title of Legislation	Citation, Chapter and Section, N.C. Code*
1. WATER SUPPLY		
(a) State Grants	Clean Water Bond Act	Ch. 677, Session Laws of 1977
(b) Regional Supply	Regional Water Supply Planning Act	162A-20 thru 25
	Sanitary Districts	130-123 thru 156.3
	Metropolitan Water Districts	162A-31 thru 58
(c) Project Plan Review	Water and Sewer Sanitation	130-161.1
(d) Quality Control	Water and Sewer Sanitation	130-157 thru 166
	Sanitarians and Water Treatment Facility Operators	90A-1 thru 29
	Water & Sewer Authorities	162A-1 thru 19
(e) Quantity Management--Surface	Water Use Act	143-215.11 thru 22
	Dam Safety Act	143-215.23 thru 215.37
	Water Resources (general)	143-350 thru 359
	Emergency Allocation Powers	143-254
	EMC Approval of Acquisition of Lands	143-215.42
	Right of Withdrawal of Impounded Waters	143-215.44 thru 215.50
	Certificate of Convenience & Necessity	62-110
--Ground	Water Use Act	143-215.11 thru 22
	Well Contractors License Act	87-65 thru 87-82
	Well Construction Act	87-83 thru 87-82
(f) Federal Program Liaison	Water and Sewer Sanitation	130-157 thru 166
	Federal Water Resources Dev. Projects	143-215.38 thru 43
	Powers and duties of EMC	143-355
	Powers & Duties of DHR & Com. of Health Services	130-9
2. WATER QUALITY		
(a) Planning	Regional Sewage Disposal Planning	162A-26 thru 30
	Sec. 201, 303(e), 208--General powers of EMC and DNRCD, auxiliary powers	143-215.3
	Planning	143-215.8A
(b) Regulation and Monitoring	Ground Absorption Sewage Disposal System Act	130-166.22 thru 166.33
	Pollution control--Generally	143-211 thru 215.6
	(Specifically Effluent Standards/	
	(EMC Policy	143.215)
	(NPDES Permits	143.215.1)
	(Septic tanks over 3000 gals.	143-215.1)

TABLE III-1 (cont.)

Major Element and Subelement	Title of Legislation	Citation, Chapter and Section, N.C. Code*
(b) Regulation and Monitoring (cont.)	Navigable Waters	76-40
	Sanitarians & Wastewater Treatment Facilities Operators	90A-1 thru 13 and 90A-35 thru 44
	Water and Sewer Authorities	162A-1 thru 19
	Sanitary District & Water-Sewer Sanitation	130-123 thru 166
	Water & Air Quality Reporting	143-215.63 thru 69
	Metropolitan Sewage Districts	162A-64 thru 80
	Solid Waste Disposal	130-166.16 thru 166.21
	Pesticide Control Act	143-434 thru 470
	Mining Act of 1971	74-46 thru 68
	Oil Pollution Control	143-215.77 thru 102
	Sanitation of Shellfish, Crustacia and Scallops	130-169.01 thru 169.06
	The Water Use Act	143-215.11 thru 215.22
	Oil & Gas Conservation Act	113-381 thru 415
	(-oil exploration	113-381)
	(-geophysical exploration	113-391)
	Industrial & Pollution Control Facilities Financing Act	159C-1 thru 26
(c) State Grants	Clean Water Bond Act	Ch. 677, Session Laws of 1977
3. FLOOD DAMAGE REDUCTION		
(a) Flood Plain Mgm't		
--Riverine	Floodway Regulation Act	143-215.51 thru 61
	Soil & Water Conservation Districts and Small Watershed Act	139-1 thru 47
	Soil & Water Conservation Commission, powers and duties	139-4
--Coastal	Hurricane Flood Protection & Beach Erosion Control Project Revolving Fund	143-215.62
	Hurricane & Other Acts of Nature	104B-3 thru 16
	Land Policy Act	113A-150 thru 159
(b) Federal Program Liaison: C of E, SCS, TVA	Federal Water Resources Dev. Projects	143-215.38
Flood Insurance	Floodway Regulation: Powers & duties of EMC & DNRCD; powers of local gov'ts.	143-215.56

TABLE III-1 (cont.)

Major Element and Subelement	Title of Legislation	Citation, Chapter and Section, N.C. Code*
4. EROSION & SEDIMENTATION		
(a) Small Watershed Mgm't	Soil & Water Conservation Districts and Small Watershed Act	139-1 thru 47
(b) Stream Sediment'n	Sedimentation Pollution Control Act	113A-50 thru 66
	Land Policy Act	113A-150 thru 159
	Mining Act of 1971	74-46 thru 68
(c) Coastal Zone	Hurricane Flood Protection & Beach Erosion Control Project Revolving Fund	143-215.62
	Hurricanes and Other Acts of Nature	104B-3 thru 16
(d) Other	Forestry Study Act	113-44.3 thru 44.6
5. LAND DRAINAGE		
(a) Small Watershed	Soil & Water Conservation Districts Law & Small Watershed Act	139-1 thru 47
	Soil & Water Conservation Commission	139-4
(b) Coastal Area	Permits to dredge or fill in or about estuarine waters or state owned lakes	113-229 and 113-230
	Coastal Area Management Act	113A-100 thru 128
	Mosquito Control	130-206 thru 209
(c) Other (including private)	Drainage	156-1 thru 141
	Easements, leases, & sale of state submerged lands	146-3, 146-6c, 146-8, and 146-12
6. NAVIGATION		
(a) State Development	Navigation	76-1 thru 24 & 40 thru 73
	Rivers & Creeks	77-1 thru 14
	State Ports Authority	143B-452 thru 143B-467
(b) Federal Liaison	Federal Water Resources Dev. Projects	143-215.38 thru 215.43
7. HYDROELECTRIC POWER	Energy Policy Act	113B-1 thru 24
	Federal Water Resources Dev. Projects	143-215.38 thru 215.43
8. RECREATION	Boating and Water Safety	75A-1 thru 26
	Acquisition & Control of State Forests and Parks	113-29 thru 41
	N.C. Trails Systems	113A-83 thru 94
	Natural and Scenic Rivers Systems	113A-30 thru 43

TABLE III-1(cont.)

Major Element and Subelement	Title of Legislation	Citation, Chapter and Section, N.C. Code*
9. FISH & WILDLIFE		
(a) General	Powers and Duties of DNER	113-1 thru 28
	Definitions, Jurisdictions of Agencies	113-127 thru 139
	Misc. Regulations & Transitional Provisions	113-261 thru 265 & 316 thru 322
	Wildlife Resources Commission	143-237 thru 254.1 and 113-301 thru 307
	Marine Fisheries Commission	113-221 thru 228
(b) Freshwater	N.C. Game Law of 1935	113-82 thru 109
	Inland Fisheries Sections	113-271 thru 294
(c) Estuarine & Marine	Marine Fisheries Articles	113-181 thru 258
	Seafood Industry Promotion	113-308 thru 315.19
	Sanitation of Shellfish, Crustacea and Scallops	130-169.01 thru 169.06
	Marine Science Council, creation, powers and duties	143B-389 thru 390
	Marine Resources Center Administrative Board	143-347.10 thru 347.14
	Marine Fisheries Compact	113-251 thru 258
10. PROTECTION OF AREAS OF ENVIRONMENTAL CONCERN		
	Environmental Policy Act	113A-1 thru 10
	Interstate Environmental Compact	113A-21 thru 23
	Coastal Area Management Act	113A-100 thru 128
	Land Policy Act of 1974	113A-150 thru 159
	Archives and History Act--Generally	121 (entire chapter)
	--title to bottom of certain waters & shipwrecks, etc.	121-22
11. OVERALL WATER RESOURCE MANAGEMENT		
	Powers & duties of EMC & DNRCD	143-350 thru 358, 143B-276 and 143B-282
	Dam Safety	143-215.23 thru 215.37
	Federal Water Resources Dev. Projects	143-215.38 thru 215.43
	Coastal Area Management Act	113A-100 thru 128
	State Planning Program--general authority	143-341
	Powers & duties of the Dept. of Human Resources & Commission for Health Services	130-9 thru 11, 143B-137 thru 138, and 143B-142

*Unless otherwise indicated.

TABLE III-2. SIGNIFICANT WATER AND RELATED LAND RESOURCE MANAGEMENT ACTIVITIES OF THE STATE OF NORTH CAROLINA, BY PRINCIPAL ELEMENTS, 1978

Principal Element	Policies & Guidelines (POL)	Basic Data & Research (DATA)	Planning (PLAN)	Review & Comment (REV)	Technical Assistance (TA)	Financial Aid (FINAID)	Regulation (REG)	Mgm't of State or Locally-owned Resources (MGMT)	Developm't, Construction, & Land Acquisition (DEV)
1. WATER SUPPLY (Surface & Ground Water)	M	(F) M	M	M	m	(F) M	(F) M	(L) O	(L) O
2. WATER QUALITY	(F) M	M	M	M	m	(F) M	(F) M	(L) O	(L) O
3. FLOOD DAMAGE REDUCTION (Riverine & Coastal)	m	O	m	M	m	(F) m	m	(L) O	(F)(L) m
4. EROSION AND SEDIMENTATION REDUCTION	M	m	M	M	m	(F) m	M	(L) O	(L) O
5. LAND DRAINAGE	M	m	m	M	m	(F) m	M	(L) O	(L) O
6. NAVIGATION	m	O	m	M	O	m	(F) O	O	(F) m
7. HYDROELECTRIC POWER	m	O	m	m	O	O	(F) O	O	(F)(L) O
8. RECREATION (Water-based)	M	m	m	M	O	(F) m	m	M	(L) m
9. FISH & WILDLIFE (Marine & fresh water)	M	m	M	M	m	(F) O	M	M	(F) m
10. PROTECTION OF AREAS OF ENVIRONMENTAL CONCERN	M	m	M	M	O	(F) O	M	M	(F) m
11. OVERALL WATER RESOURCE MANAGEMENT	M	m	(F) M	M	O	O	m	O	(F) O

Legend: M= Major State activity; m= Minor State activity; O= no significant State activity; F= Major Federal activity; L= Major Local activity.

by the voters in November 1977 (Chap. 677, Session Laws of 1977). An important complementary Federal program is that of rural water supply planning and construction grants of the Farmers Home Administration.

Direct State planning for meeting water supply requirements on both long-range and short-range bases is also authorized (G.S. 14.3-350 thru 357 and 162A-20 thru 25), although actual development and management of water supplies is not a State responsibility. The State has authority to make binding agreements with Federal water resource development agencies such as the U.S. Army Corps of Engineers to ensure that domestic water supplies are made available where needed from Federal multiple-purpose reservoirs (G.S. 143-215.38 thru .43).

The third major role of the State under Water Supply is the overall quantity management of surface and ground waters. Of greatest importance is the authority in the Water Use Act of 1967 (G.S. 143-215.11 thru 22) to designate geographic areas of existing or impending surface or ground water shortage ("capacity use" areas) and regulate the development and use of water resources in such areas (Hufschmidt and Stevens, 1978). In addition, the State regulates the construction, repair and abandonment of ground water wells, controls releases of water from non-Federal stream impoundments, and has emergency powers of allocation of domestic water supplies (G.S. 87-65 thru 82; 143-215.23 thru .37; 143-254).

Specific authority for State agencies to do water supply planning is contained in a number of the Acts discussed above, especially the Regional Water Supply Planning Act (G.S. 162A-20 thru 25), Water Use Act (G.S. 143-215.11 thru .22) and the Dam Safety Act (G.S. 143-215.23 thru .37).

Water Quality

The State's water quality legislation has been closely patterned after the Federal program as authorized by Public Law 92-500 in 1972 and by the 1977 Amendments--now known collectively as the Clean Water Act of 1977. The major thrust of the State program is regulatory, involving control of all major point sources of pollution--public and private--discharging to surface or ground waters, establishment of ambient stream standards and effluent standards, and regulation of septic tanks and other sewage disposal systems that do not discharge into surface waters (G.S. 143.211 thru 215.6). The State has assumed the authority, under provisions of the Clean Water Act, to issue the "National Pollution Discharge System" (NPDS) permits (G.S. 143-215.1). Broad authority also exists for regulation of ground water pollution, and water pollution incident to solid waste disposal (G.S. 130-166), as well as water pollution associated with pesticides, mining, oil and gas development and shellfish. In general, State regulatory authority over point sources appears to be adequate, but there are serious deficiencies in comparable authority over non-point sources, especially from agricultural and forestry activities.

Supporting the comprehensive regulatory program are provisions for State water quality planning. Again authority for this State planning is closely patterned on the planning provisions of the Clean Water Act of 1977. It includes preparation of basin-wide water quality plans as required under Section 303(e) of the Federal Act; comprehensive area-wide plans, involving both non-point and point sources of pollution, under Section 208, and Section 201 project level (facility) plans for waste water disposal and treatment (G.S. 143-215.3 and 215.8A). In addition, there is specific authority for State initiative in regional sewerage disposal planning (G.S. 162-A-26 thru 30).

The State also provides financial aid in the form of grants to local governments for construction of wastewater treatment plants, under provisions of the Clean Water Bond Acts of 1971 and 1977 (Chap. 677, Session Laws of 1977). These grants, of up to 12 1/2 percent of total construction costs, supplement Federal construction grants of 75 percent under the Clean Water Act.

This comprehensive body of water quality legislation provides authority to State agencies to set policies and guidelines, collect basic data and engage in research, and review all relevant public and private projects for water quality consequences. There is limited State activity on technical assistance to local agencies and the State has no authority to engage in direct construction or operation of waste treatment facilities (except as incidental to other State activities).

Flood Damage Reduction

State legislation on flood management is very limited, reflecting the historic dominance of the Federal government in this field. The Floodway Regulation Act of 1971 and 1973 authorizes local governments to delineate floodways and regulate artificial obstructions in them and provides non-mandatory authority for State agencies to delineate and regulate floodways where local agencies fail to act (G.S. 143-215.51 thru .61). There is also authority for technical assistance to local communities, especially to help them to participate in the Federal Flood Insurance Act. However, in contrast to the water quality field, there is no strong State requirement for planning and regulation of land uses for flood control.

State authority is available to cooperate with and support major Federal activities in flood control, including the program of the U.S. Army Corps of Engineers, the TVA and the Soil Conservation Service (G.S. 143-215.38). There is special legislation relating to soil and water conservation districts which participate with the SCS in planning and building small-watershed projects in which flood control is often an important purpose (G.S. 139.1 thru .47). Also, the State has a modest program of planning and financial aid for coastal flood protection and beach erosion control (G.S. 143-215.62; 104B-3 thru 16).

Perhaps the most important State flood management rule under this legislation is to review and comment on Federal and Federally-planned flood control projects and programs. However, there is no comprehensive State flood management program, involving setting policies and guidelines, planning, technical assistance regulation and financial aid.

Erosion and Sedimentation

Major State legislation is the Sedimentation Pollution Control Law of 1975 which provides for a system of State standards, and sedimentation control planning for non-agricultural, non-forestry and non-mining activity lands

(G.S. 113A-50 thru 66). Within the limited scope of the Act (primarily urban and transportation activities) there is strong authority for setting policies and guidelines, planning, review of local sedimentation control plans, and regulation.

In addition to this Act, the Mining Act of 1971, Coastal Zone erosion control legislation and the soil and water conservation legislation also provide limited policy and regulatory authority on erosion and sedimentation (G.S. 74-46 thru 68; 104B-3 thru 16; 139.1 thru .47).

Land Drainage

State legislation relating to land drainage is primarily regulatory and to a lesser degree planning and technical assistance. Land drainage is often a major purpose of SCS small watershed projects and the State legislation on cooperation with the SCS and local soil conservation districts is relevant here (G.S. 139.1 thru .47). In the Coastal Area, where land drainage is especially important, two other Acts are especially important. (1) A 1969 Act regulates dredging and filling in estuarine waters, tidelands, marshlands and State-owned lakes (G.S. 113-229 and -230). The Federal government has a parallel regulatory program for dredge and fill under Section 404 of the Clean Water Act. (2) The N.C. Coastal Area Management Act (CAMA) enacted in 1974 in response to the passage in 1972 of the Federal Coastal Zone Management Act provides for a cooperative State-local program of coastal area management to protect coastal land and water resources and provide for their orderly development and management (G.S. 113A-100 thru 128). Under the Act, the State designates "Areas of Environmental Concern" (AECs) and issues permits for development within AECs; in addition, the State provides technical help to counties to prepare county-wide land use plans. Land drainage is an important development activity governed by the provisions of CAMA.

The State also has a special program of regulation, planning and technical help for mosquito control which often includes land drainage (G.S. 130-206 thru 209).

Navigation

The State relies primarily on the Federal navigation program of the U.S. Army Corps of Engineers and to this end has enacted State cooperative legislation relating to Federal water resource development projects (G.S. 143-215.38 thru .43). There is legislative authority for direct State development and management of small navigation projects, and for port development through the State Ports Authority (G.S. 76-1 thru 24, 40 thru 73; G.S. 143B-452 thru 467).

Hydroelectric Power

State authority over hydroelectric power development is limited, as the Federal Government has largely pre-empted the field. Privately developed hydro power projects must receive a Certificate of Convenience and Necessity and construction permit from the State (G.S. 62-110). In addition such projects must receive a Federal permit from the Federal Energy Regulatory Commission. As for possible hydroelectric development at Federal water resource projects, the State cooperative legislation relating to such projects governs (G.S. 143-215.38 thru .43).

Recreation

State authority in the field of water-based recreation involves developing and maintaining a State Comprehensive Outdoor Recreation Plan (SCORP) as mandated by the Federal Land and Water Conservation Act which provides Federal grants for acquisition and development of State and local recreation areas. The State also acquires, develops and manages a system of State parks and recreation areas, including recreation at Federal multiple purpose reservoirs such as Kerr Lake (G.S. 113-29 thru 41). The State also has authority to develop a natural and scenic rivers system and a trails system (G.S. 113A-30 thru 43; 113A-83 thru 94).

An important State activity in the field of water-based recreation is the development of a statewide policy with respect to the recreation aspects of Federal and State water resource plans and projects.

Fish and Wildlife

State legislation is extensive and complex in this field, covering freshwater, estuarine and marine fisheries and wildlife; the legislation is supplemented by an extensive body of Federal law. A primary focus is regulation of sports and commercial hunting and fishing and of development, especially dredge and fill, in coastal and estuarine areas that affect the fishery and wildlife resources. A second major emphasis is on planning and management of State-owned wildlife reserves and fishery facilities. A third is review and comment on the fish and wildlife aspects of public and private water resource development and management projects and programs. Associated with these activities is the development of statewide Policies and Guidelines on the fish and wildlife resources as they are related to overall water resource development and management (G.S. 113-82 thru 307; 143-237 thru 254.1).

Protection of Areas of Environmental Concern

State legislation in this field has significant implications for water resources. The State Environmental Policy Act, enacted in 1971 and closely patterned after the National Environmental Policy Act of 1969, provides for preparation and review of environmental impact statements on State projects (G.S. 113A-1 thru 10). One of the principal objectives of the Coastal Area Management Act (CAMA) is the protection of environmental resources (G.S. 113A-100 thru 128). The Land Policy Act of 1974 authorized the preparation of a statewide land policy, including policies for the natural environment (G.S. 113A-150 thru 159). Major State activities under this body of legislation are development of State Policies, Planning, and Review and Comment. In addition, under the State legislation for recreation and fish and wildlife programs discussed above, Regulation and Management of State-Owned Resources contribute to the protection of areas of environmental concern.

Overall Water Resource Management

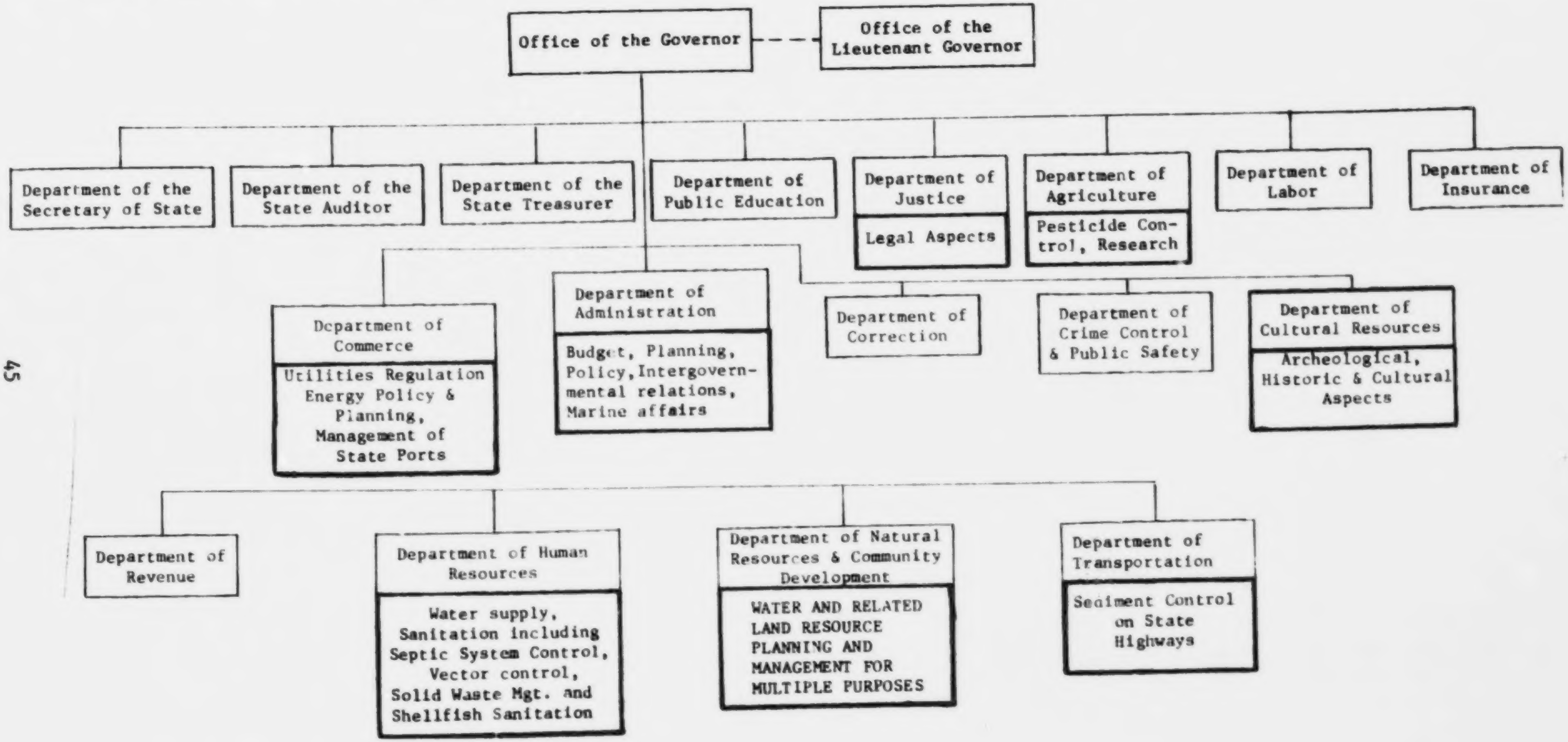
In addition to the legislation covering specific water resource elements as summarized in Items 1 through 10 of Table III-1 and discussed briefly above, there is authorizing legislation covering the broad domain of water and related land resources. This general legislation covers planning, policy development, basic data and research, cooperation with Federal agencies and regulation during periods of water emergency (G.S. 143-350 thru 358). General water resource planning and management authority for public health purposes is contained in the legislation defining the powers and duties of the environmental health agencies (G.S. 130-9 thru 11; 143B-137 thru 138 and -142). In addition, the Coastal Area Management Act (G.S. 113A-100 thru 128), the Dam Safety Act (G.S. 143-215.23 thru .37) and the act authorizing cooperation on Federal water resource development projects (G.S. 143-215.38 thru .43) provide general authority for State water resource planning.

Organizational Structure

In 1972-73, the Executive Branch of the State Government was reorganized to establish a departmental structure. All administrative functions were assigned to 17 departments. The heads of nine of these departments are appointed by and are directly responsible to the Governor; the others continue to be elected. The basic structure as of 1977 is shown in Figure III-1.

Most water resource activities along with other natural resource activities of State government are the responsibility of the Department of Natural Resources and Community Development. In fact, only one other Department--Human Resources--has any significant role in the water resource field. Its primary concern is with the public health aspects of water resources, including water supply and basic sanitation. Other Departments have only peripheral, related, or supporting interests: the Department of Agriculture, pesticide control; the Department of Commerce, utilities regulation, energy policy, and management of State ports; the Department of Cultural Resources, archeological, historic and cultural aspects; the Department of Transportation, State highway-water resource relationships including sediment control along State highways; the Department of Justice, legal aspects of water resources; and the Department of Administration, budgetary, planning, policy and intergovernmental relations and some marine affairs aspects of water resources. An overall indication of the limited role played by these departments is given in Table III-3, which summarizes the activities of these departments for each of the eleven major water resource elements. In

FIGURE III-1. ORGANIZATION OF EXECUTIVE BRANCH, STATE OF NORTH CAROLINA, 1978, SHOWING MAJOR AND MINOR WATER RESOURCE ACTIVITIES*


Office of the Governor
Office of the Lieutenant Governor
Department of the Secretary of State
Department of the State Auditor
Department of the State Treasurer
Department of Public Education
Department of Justice
Legal Aspects
Department of Agriculture
Pesticide Control, Research
Department of Labor
Department of Insurance
Department of Commerce
Utilities Regulation Energy Policy & Planning, Management of State Ports
Department of Administration
Budget, Planning, Policy, Intergovernmental relations, Marine affairs
Department of Correction
Department of Crime Control & Public Safety
Department of Cultural Resources
Archeological, Historic & Cultural Aspects
Department of Revenue
Department of Human Resources
Water supply, Sanitation including Septic System Control, Vector control, Solid Waste Mgt. and Shellfish Sanitation
Department of Natural Resources & Community Development
WATER AND RELATED LAND RESOURCE PLANNING AND MANAGEMENT FOR MULTIPLE PURPOSES
Department of Transportation
Sediment Control on State Highways

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*Adapted from North Carolina Manual, 1977

Legend: Major Water Resource Programs   Minor or Related Activities

TABLE III-3. WATER RESOURCE MANAGEMENT ACTIVITIES, STATE OF NORTH CAROLINA, BY MAJOR ELEMENT AND GOVERNMENT ORGANIZATION

Reproduced from best available copy.

MAJOR ELEMENT / Department & Agency	HUMAN RESOURCES: Health Serv. Div. Sanitary Eng. Sect.	DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT: Envir. Mgt. Com.	Envir. Management Div: Water Resource Planning	Envir. Management Div: Water Quality	Envir. Management Div: Ground Water	Office of Public Works	Soil & Water Conserv. Com.	Sediment Control Com.	Land Policy Council	Land Resources Div.	Recreation Council	Parks & Rect. Div.	Marine Fisheries Com.	Marine Fisheries Div.	Coastal Resources Com.	Office of Coastal Resources	Wildlife Resources Com.	Wildlife Resources Division	Forestry Council	Forest Resources Division	Community Assist'ce Division	DEPARTMENT OF ADMINISTRATION	DEPARTMENT OF AGRICULTURE	DEPARTMENT OF TRANSPORTATION	DEPARTMENT OF CULTURAL RESOURCES	DEPARTMENT OF COMMERCE
1. Water Supply:																										
(a) State grants	FINAID, TA	POL																				T.NAID FINAID				
(b) Regional water supply	PLAN,REV,TA,FINAID	POL	PLAN																							REV,REG,POL
(c) Project plan review	REV, REG																									
(d) Quality control	REV, TA, REG									REG																
(e) Quantity mgmt: Surface		POL,REG	DATA PLAN,REV																							
Ground		POL,REG	PLAN		DATA, REV,REG																					
(f) Federal Program liaison, Corps, SCS, FHA	REV	POL	PLAN REV			POL,PLAN, REV,FINAID																				
2. Water Quality:																										
(a) Planning, Sect. 201, 303(e), 208	DATA, PLAN	POL		DATA PLAN,REV																			POL,REG, TA			
(b) Regulation & Monitoring	REV,TA,REG	POL		DATA, REV, TA, REG																						
(c) State & Fed. grants		POL		TA,FINAID																						
3. Flood Damage Reduction:																										
(a) Flood Plain Mgmt., riverine & coastal		POL	PLAN			POL,REV, TA,REG			POL																	
(b) Federal program liaison, Corps, SCS, TVA		POL	PLAN, REV			POL,REV, TA,FINAID, DEV	POL			PLAN, REV,TA											TA					
Flood Insur. Admin.		POL				POL, TA, PLAN																				
4. Erosion & Sedimentation Reduction:																										
(a) Erosion control & small watershed mgt.		POL	PLAN, REV	PLAN			POL		POL	DATA, PLAN,REV, TA,FINAID									POL	DATA						
(b) Stream sedimentation control			PLAN	PLAN				POL		REV, TA, REG														MGMT		
5. Land Drainage:																										
(a) Small watershed		POL	PLAN, REV				POL		POL	DATA, PLAN,REV, TA,FINAID			POL	REG	POL	REG										
(b) Other (private)	REV, TA, DEV	POL	PLAN, REV						POL	REV			POL	REG	POL	REG						POL,REG,REV				
6. Navigation:																										
(a) Federal program liaison		POL	PLAN, REV			PLAN,REV, FINAID									POL	REV										
(b) State development		POL	PLAN,REV			PLAN,REV, FINAID,DEV									POL	REV										
7. Hydroelectric Power:																										
(a) Federal program liaison		POL	PLAN,REV			PLAN,REV																				REV,REG
8. Recreation (including scenic & cultural):		POL	PLAN,REV			PLAN,REV, FINAID			POL		POL	DATA, PLAN,REV, MGMT,DEV			POL	REV,REG										
9. Fish & Wildlife:																										
(a) Marine	REG		PLAN,REV			PLAN							POL	DATA,PLAN, REV,TA, REG,MGMT	POL	REV,REG										
(b) Freshwater	REG		PLAN,REV			PLAN			POL								POL,REG	DATA,PLAN, REV,TA, MGMT,DEV								
10. Protection of Areas of Envir. Concern:			PLAN,REV						POL		POL	DATA, PLAN,REV, MGMT,DEV	POL	PLAN,REV, MGMT,DEV	POL	DATA,PLAN, REV,REG	POL	DATA,PLAN, REV,MGMT							REV,DATA	REV,REG
11. Overall Water Management:																										
Planning		POL	PLAN,REV			PLAN,REV												REV				POL,PLAN,REV				
Coastal area management															POL	DATA,PLAN, REV,REG		REV								
Federal program liaison		POL				POL,PLAN, REV,FINAID												REV								
Regulation		POL								REG																

Legend:
DATA -Basic data and research
DEV -Development, construction and land acquisition
FINAID-Financial aid--grants, loans
MGMT -Management of State-owned resources
PLAN -Planning
POL-Policies and guidelines
REG-Regulation
REV-Review and comment
TA -Technical assistance

contrast to the numerous entries in the table for the Department of Natural Resources and Community Development, there are only a few entries for the other departments.

Department of Natural Resources and Community Development

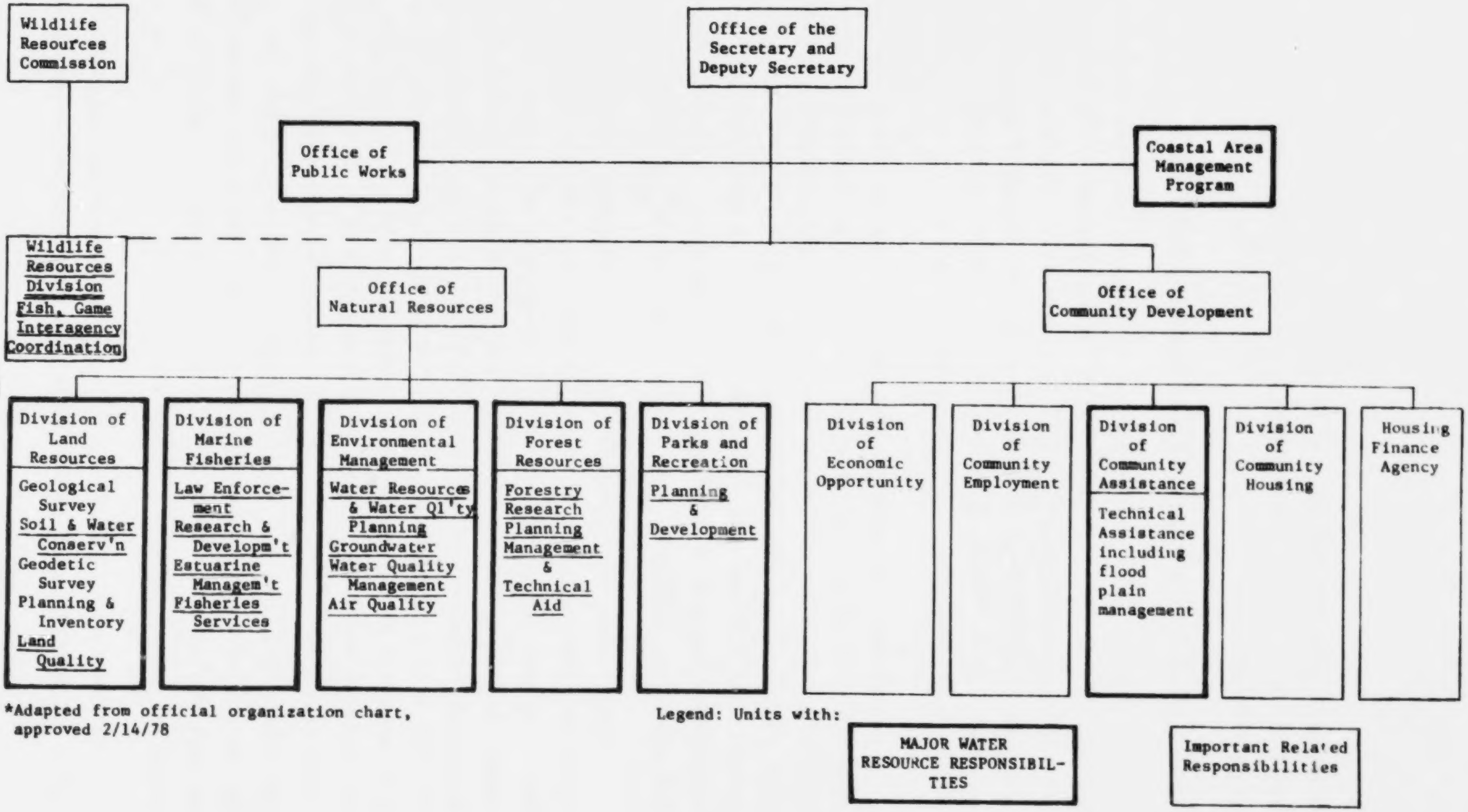
As of early 1978, the Department of Natural Resources and Community Development had just undergone a major reorganization. The resulting organizational structure, depicted in Figure III-2, contains two major groupings of activities--natural resources and community development, each designated as an Office and headed by an Assistant Secretary. Each such Office has supervision over five operating divisions.

Each of the five natural resources divisions and one of the community development divisions has important water resource responsibilities. In addition, the Office of Public Works and the Coastal Area Management Program which report directly to the Secretary have major roles in water resources. Finally, the Wildlife Resources Division which is directly responsible to the Wildlife Resources Commission rather than to the Secretary of the Department has important water resource related activities.

Historically, North Carolina relied on part-time, appointed citizen boards and commissions for much of its executive control, including control over programs, budgets and administration as well as policy. Thus, as discussed in Chapter II, an appointive Board of Water and Air Resources exercised control over State water resource policy and administration until the 1972 general reorganization act. This Act, while deleting the administrative authority of the boards and commissions, continued their policy-making and advisory functions. Thus, as depicted in Figure III-3, the organizational structure of the Department of Natural Resources and Community Development contains both administrative offices and divisions and policy and advisory boards, commissions and councils. The links between these two types of units are depicted in Figure III-3, as administrative and advice and policy flows of information.

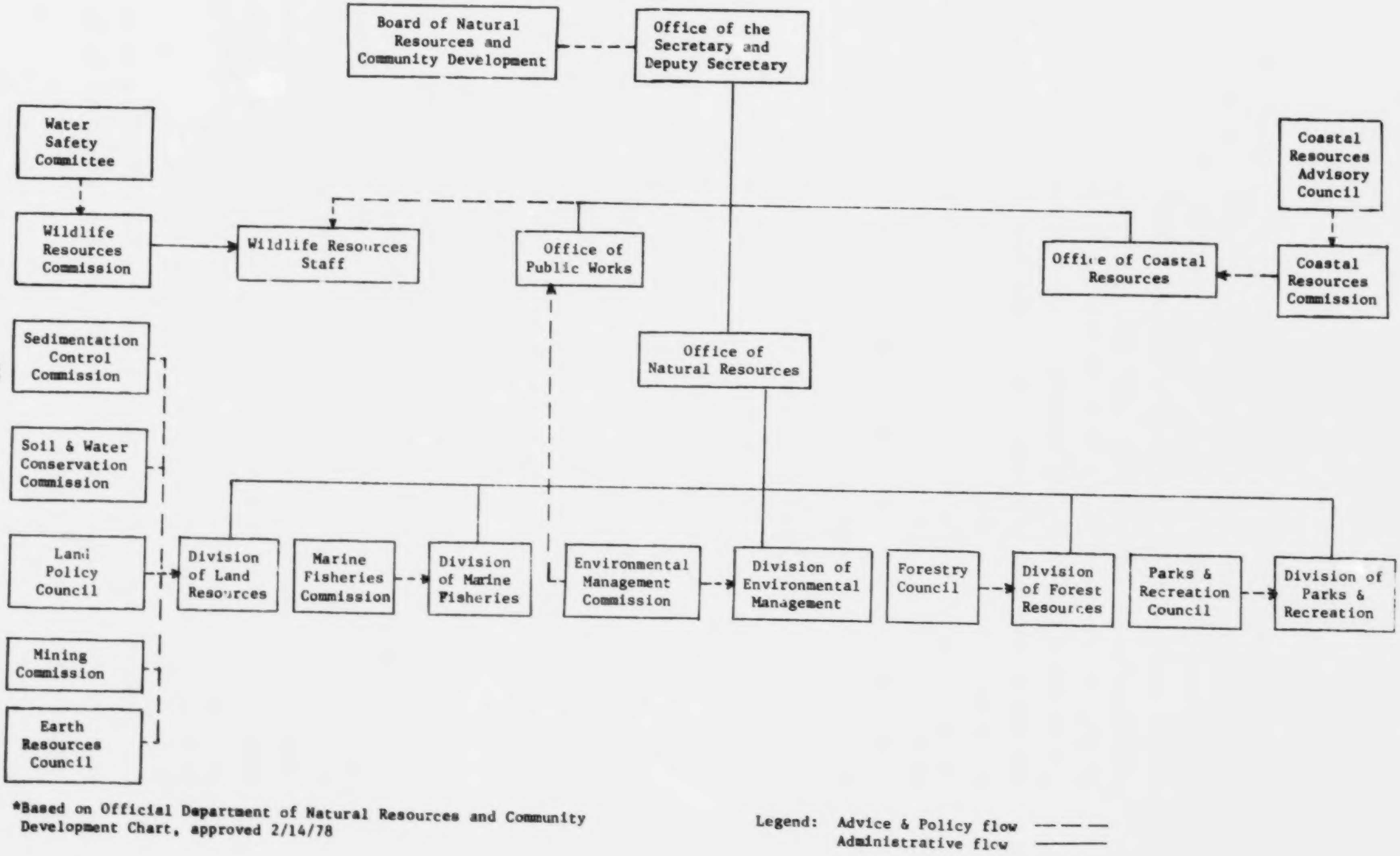
The Environmental Management Commission is much the most important policy and advisory unit in the field of water resources. This is shown

FIGURE III-2. ORGANIZATION OF DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, 1978,* SHOWING MAJOR AND RELATED WATER RESOURCE ACTIVITIES AND RESPONSIBILITIES


Wildlife Resources Commission
Office of the Secretary and Deputy Secretary
Office of Public Works
Coastal Area Management Program
Wildlife Resources Division
Fish, Game
Interagency Coordination
Office of Natural Resources
Office of Community Development
Division of Land Resources
Geological Survey
Soil & Water Conserv'n
Geodetic Survey
Planning & Inventory
Land Quality
Division of Marine Fisheries
Law Enforcement
Research & Developm't
Estuarine Managem't
Fisheries Services
Division of Environmental Management
Water Resources & Water Ql'ty Planning
Groundwater
Water Quality Management
Air Quality
Division of Forest Resources
Forestry Research
Planning
Management & Technical Aid
Division of Parks and Recreation
Planning & Development
Division of Economic Opportunity
Division of Community Employment
Division of Community Assistance
Technical Assistance including flood plain management
Division of Community Housing
Housing Finance Agency
Legend: Units with:
MAJOR WATER RESOURCE RESPONSIBILITIES
Important Related Responsibilities

*Adapted from official organization chart, approved 2/14/78

FIGURE III-3. ORGANIZATION OF NATURAL RESOURCE ACTIVITIES IN THE DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, 1978,* SHOWING THE FLOW OF POLICY AND ADMINISTRATION AMONG ADMINISTRATIVE UNITS AND POLICY AND ADVISORY COMMISSIONS, COMMITTEES, COUNCILS AND BOARDS.


Board of Natural Resources and Community Development
Office of the Secretary and Deputy Secretary
Water Safety Committee
Wildlife Resources Commission
Wildlife Resources Staff
Office of Public Works
Office of Coastal Resources
Coastal Resources Advisory Council
Coastal Resources Commission
Office of Natural Resources
Sedimentation Control Commission
Soil & Water Conservation Commission
Land Policy Council
Mining Commission
Earth Resources Council
Division of Land Resources
Marine Fisheries Commission
Division of Marine Fisheries
Environmental Management Commission
Division of Environmental Management
Forestry Council
Division of Forest Resources
Parks & Recreation Council
Division of Parks & Recreation
Legend: Advice & Policy flow – – –
Administrative flow ———

*Based on Official Department of Natural Resources and Community Development Chart, approved 2/14/78 graphically in Table III-3, where the Commission is shown to have a policy-forming role in almost every one of the major water resource elements. This Commission is the major policy body for the Division of Environmental Management and the Office of Public Works. Other commissions that are important for water resources are the Sedimentation Control Commission, Soil and Water Conservation Commission and Land Policy Council which provide policy guidance to the Division of Land Resources; the Marine Fisheries Commission, for the Division of Marine Fisheries; and the Coastal Resources Commission, and Coastal Resources Advisory Council, for the Office of Coastal Resources which administers the Coastal Zone Management Act. As indicated earlier, the Wildlife Resources Commission, unlike the others, retains administrative as well as policy control of the Wildlife Resources staff.

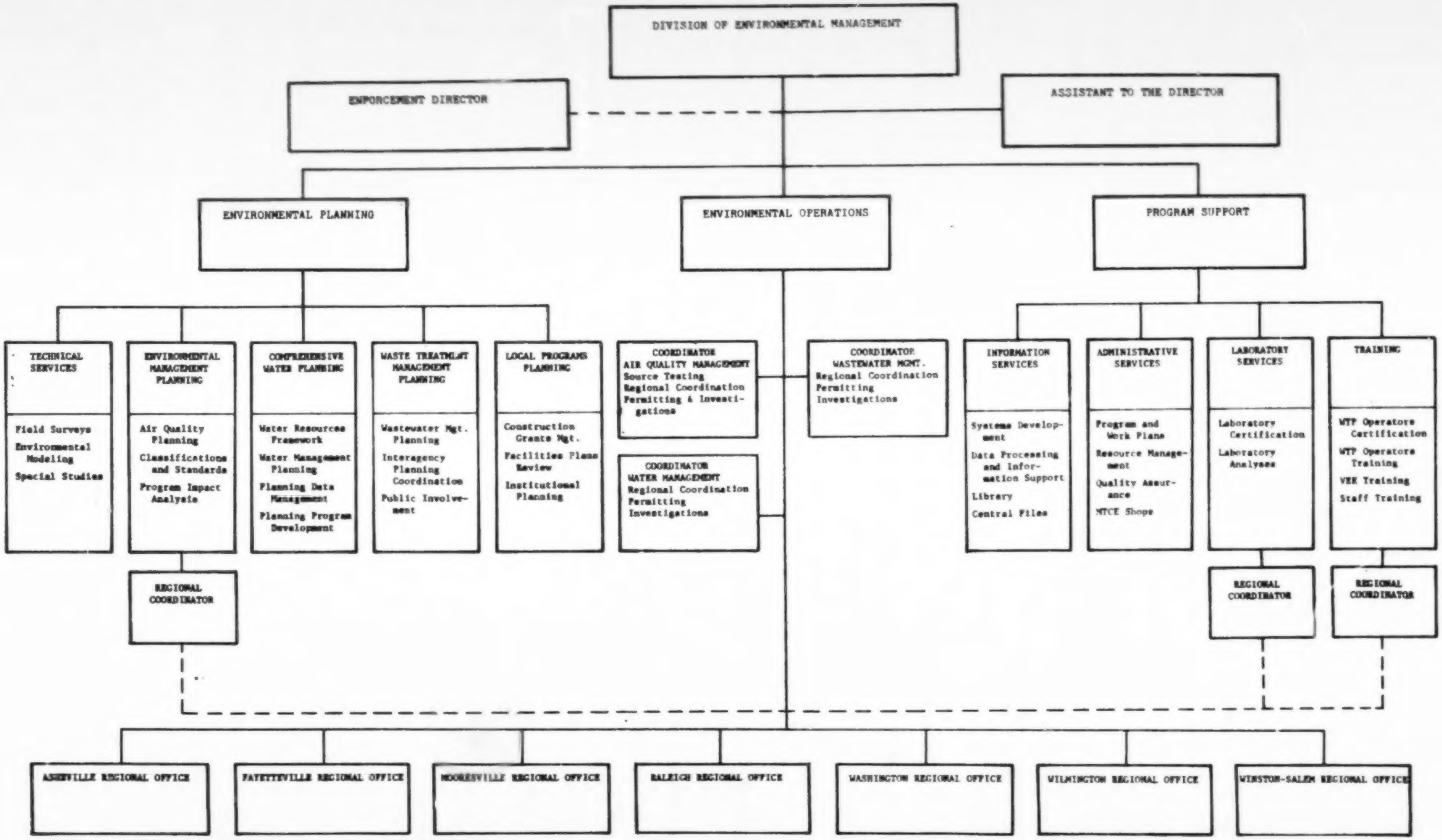
Division of Environmental Management

Throughout several internal reorganizations of DNRCD since 1973, this Division has continued to be responsible for an important share of the water resource activities within DNRCD, including complete responsibility for water quality management and ground water resources and (since mid-1976) the leading role in comprehensive water resource planning. The wide range of these responsibilities over the eleven major water resource elements is shown in Table III-3.

In September 1978, the Division of Environmental Management was reorganized on a functional basis--that is, into major divisions of environmental planning, environmental operations, and program support, as shown in Figure III-4. The program and policy domain was the "environment," specifically air resources and water resources, and the primary functional emphasis of planning, operations and support was designed to serve the entire domain. Accordingly water resource (including water quality) planning, management and support services are only a part (although a major part) of these major functional activities.

However, water quality planning and operations continues to be the dominant activity in the Division of Environmental Management in terms of total funds expended and numbers of personnel.

FIGURE III-4. ORGANIZATION OF THE DIVISION OF ENVIRONMENTAL MANAGEMENT, DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT, SEPTEMBER 1978*


DIVISION OF ENVIRONMENTAL MANAGEMENT
ENFORCEMENT DIRECTOR
ASSISTANT TO THE DIRECTOR
ENVIRONMENTAL PLANNING
ENVIRONMENTAL OPERATIONS
PROGRAM SUPPORT
TECHNICAL SERVICES
Field Surveys
Environmental Modeling
Special Studies
ENVIRONMENTAL MANAGEMENT PLANNING
Air Quality Planning
Classifications and Standards
Program Impact Analysis
COMPREHENSIVE WATER PLANNING
Water Resources Framework
Water Management Planning
Planning Data Management
Planning Program Development
WASTE TREATMENT MANAGEMENT PLANNING
Wastewater Mgt. Planning
Interagency Planning Coordination
Public Involvement
LOCAL PROGRAMS PLANNING
Construction Grants Mgt.
Facilities Plans Review
Institutional Planning
COORDINATOR AIR QUALITY MANAGEMENT
Source Testing
Regional Coordination
Permitting & Investigations
COORDINATOR WASTEWATER MGMT.
Regional Coordination
Permitting
Investigations
COORDINATOR WATER MANAGEMENT
Regional Coordination
Permitting
Investigations
INFORMATION SERVICES
Systems Development
Data Processing and Information Support
Library
Central Files
ADMINISTRATIVE SERVICES
Program and Work Plans
Resource Management
Quality Assurance
MTCE Shops
LABORATORY SERVICES
Laboratory Certification
Laboratory Analyses
TRAINING
WTP Operators Certification
WTP Operators Training
VEE Training
Staff Training
REGIONAL COORDINATOR
REGIONAL COORDINATOR
REGIONAL COORDINATOR
ASHEVILLE REGIONAL OFFICE
FAYETTEVILLE REGIONAL OFFICE
MOORESVILLE REGIONAL OFFICE
RALEIGH REGIONAL OFFICE
WASHINGTON REGIONAL OFFICE
WILMINGTON REGIONAL OFFICE
WINSTON-SALEM REGIONAL OFFICE

*Adapted from DEM, DNRCD Organization Chart dated September 1, 1978.

PLANS REVIEW
CONDUCT MONITORING
PLANNING LIAISON
ENVIRONMENTAL REVIEWS
OPERATOR TRAINING
TIME SENSITIVE LABORATORY ANALYSES
INSPECTIONS
INVESTIGATIONS
ENFORCEMENT

Thus, the functional organization has operated to diffuse the Division's other water resource responsibilities throughout the many units of the Division, including both the central office and the regional offices where the primary emphasis continues to be water quality. Only in the Comprehensive Water Planning Branch in the Environmental Planning Section, and the relatively small Coordinator Water Management Branch in the Environmental Operations Section is there focus on water management as a whole.

Office of Public Works

This small office, which in 1978 reported to the Deputy Secretary of the Department of Natural Resources and Community Development, was created in 1976 to administer a number of water resource development responsibilities which had been lodged in the Department of Water and Air Resources prior to the 1973 reorganization plan. These include coordination of water resource project planning and development with certain Federal agencies including the U.S. Army Corps of Engineers and the Tennessee Valley Authority, and management of Federal and State aid to local governments for water resource development projects. This office has also been assigned the responsibility of developing a statewide program for flood management. The major water resource elements which are of concern to the Office are shown in Table III-3.

Other DNRCD Divisions

The other Divisions with major water resource responsibilities as shown in Figure III-2 are:

The Division of Land Resources which has two important activities--(1) the small watershed planning and development program of technical and financial aid to county soil conservation districts, and (2) the State sedimentation control program.

The Division of Marine Fisheries, with regulatory, management and research responsibilities on estuarine and coastal commercial and sports fisheries.

The Division of Wildlife Resources, with planning, regulatory, management and research responsibilities for wildlife resources and inland fisheries.

The Divisions of Parks and Recreation, and Forest Resources, which have basic data, research, planning and management responsibilities for State parks and forests, including water-based recreation in these areas and on some Federal multi-purpose reservoirs.

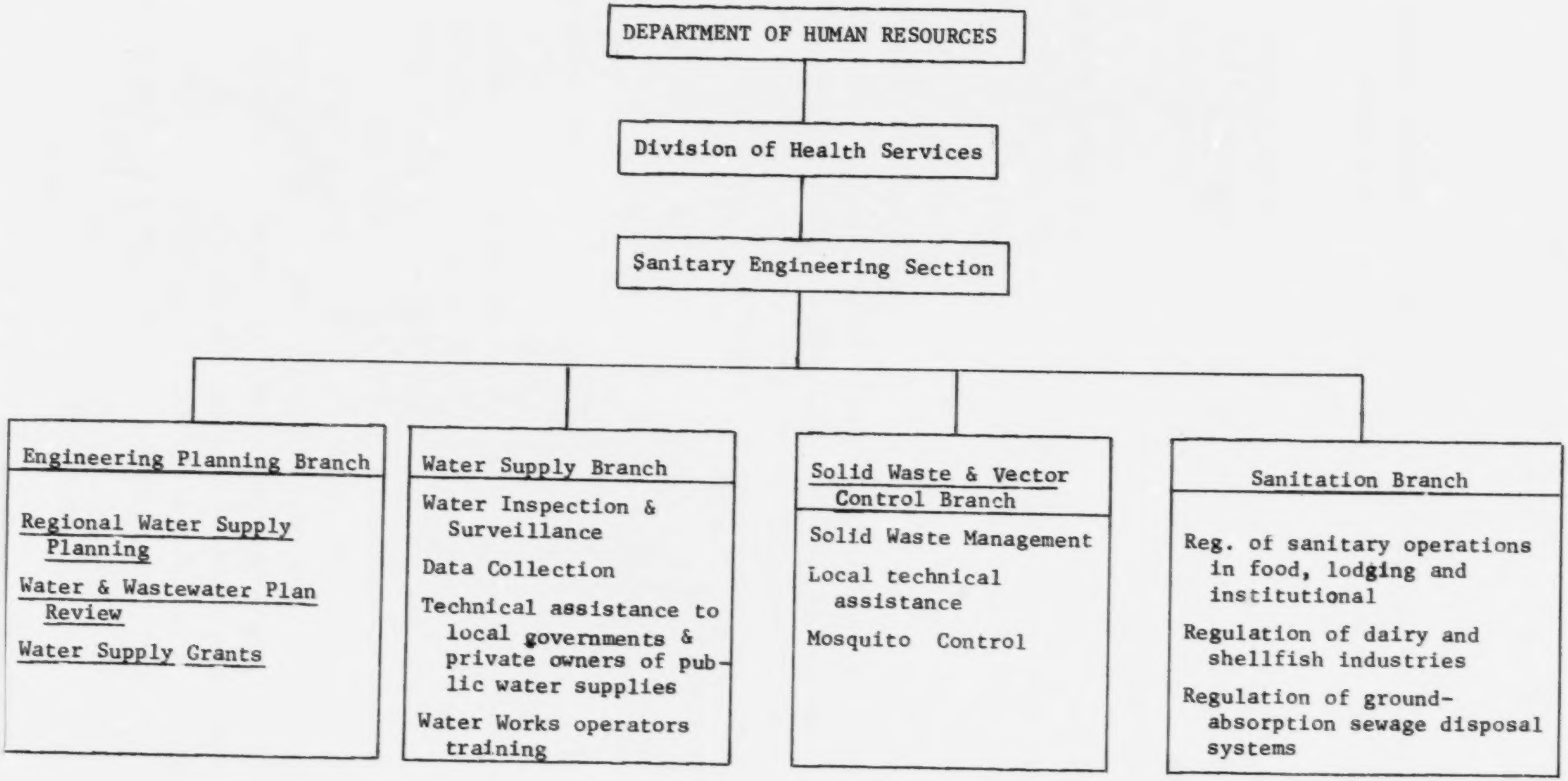
The Division of Community Assistance which provides a limited amount of technical aid to local communities on flood plain management, including meeting the requirements of the National Flood Insurance program.

Finally, the Coastal Area Management Program, which reports directly to the Office of the Secretary, administers the Coastal Area Management Act which authorizes creation of a comprehensive land use planning and regulatory system for the coastal and estuarine counties. Primary responsibility for preparation of land use plans is with the counties, but the State has overall policy control, and has authority to designate critical areas of environmental concern.

Department of Human Resources

Historically, concern for the public health aspects of water supplies, wastewaters and solid wastes was a responsibility of the State Board of Health. Since the 1973 reorganization, these responsibilities have been lodged in the Division of Health Services of the Department of Human Resources (DHR). Although major responsibility for water pollution control, including public health aspects, is in the Division of Environmental Management, DNRCD, the Sanitary Engineering Section of the Division of Health Services, DHR, has important responsibilities in regulating the safety of public water supplies, in control of transport and disposal of solid wastes, especially toxic and hazardous wastes, and in regulation of ground absorption sewage disposal systems of less than 3,000 gallons capacity. As shown in Figure III-5, these responsibilities are discharged through four branches.

FIGURE III-5. ORGANIZATION OF SANITARY ENGINEERING SECTION, DEPARTMENT OF HUMAN RESOURCES, 1978, SHOWING MAJOR WATER RESOURCE AND RELATED ACTIVITIES*


DEPARTMENT OF HUMAN RESOURCES
Division of Health Services
Sanitary Engineering Section
Engineering Planning Branch
Regional Water Supply Planning
Water & Wastewater Plan Review
Water Supply Grants
Water Supply Branch
Water Inspection & Surveillance
Data Collection
Technical assistance to local governments & private owners of public water supplies
Water Works operators training
Solid Waste & Vector Control Branch
Solid Waste Management
Local technical assistance
Mosquito Control
Sanitation Branch
Reg. of sanitary operations in food, lodging and institutional
Regulation of dairy and shellfish industries
Regulation of ground-absorption sewage disposal systems

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*Adapted from DHR, DHS, Operational Program Plan, 1977.

The water resource related activities of the Department of Human Resources have become increasingly significant since enactment in 1974 of the Federal Safe Drinking Water Act (P.L. 93-523), which has greatly expanded the scope of State regulation of public water supplies, and of the Resource Conservation and Recovery Act of 1976 (P.L. 94-580), which extends the State's authority over toxic and other hazardous wastes.

Federal Agency Linkages

Major Federal water resource activities were located in the following Federal departments and agencies as of mid-1978:

- Department of Agriculture:
    - Agricultural Stabilization and Conservation Service
    - Farmers Home Administration
    - Soil Conservation Service
- Department of Commerce:
    - Economic Development Administration
    - National Oceanic and Atmospheric Administration
- Department of Defense:
    - Army Corps of Engineers
- Department of Housing and Urban Development:
    - Community Development Grants
    - National Flood Insurance Program
- Department of the Interior:
    - Bureau of Reclamation
    - Fish and Wildlife Service
    - Geological Survey
    - Heritage Conservation and Recreation Service
    - National Park Service
- Environmental Protection Agency
- Federal Energy Regulatory Administration
- Tennessee Valley Authority
- Water Resources Council

The Water Resources Council is the policy and program coordinating agency of the Federal government to which, in theory, States can look for Federal leadership and guidance. Actually, Federal-State water resource linkages are quite complex. As shown in Table III-4, the links of Federal

TABLE III-4. MAJOR FEDERAL WATER RESOURCE PROGRAMS, CLASSIFIED BY MAJOR ELEMENTS AND AGENCY, SHOWING THE PRIMARY STATE AGENCY OR AGENCIES INVOLVED

Federal Programs	Primary State Cooperating Agency
1. Water Supply	
Farmers Home Administration	
Rural water supply planning & construction grants and construction loans to local agencies	Human Resources, Sanitary Engineering Section
Soil Conservation Service	
Water supply in small watershed projects	DNRCD, Land Resources Division
Corps of Engineers	
Water supply in multiple-purpose reservoirs--planning, construction, operation & maintenance	DNRCD, Division of Environmental Management, Comprehensive Planning Branch; Office of Public Works
Economic Development Administration	
Water supply grants to local agencies	Human Resources, Sanitary Engineering Section
Environmental Protection Agency	
Regulation of domestic water supplies Grants to State for management of State regulatory program	Human Resources, Sanitary Engineering Section
Dept. of Housing & Urban Development	
Community development grants to localities	Human Resources, Sanitary Engineering Section
Geological Survey	
Determination of availability and use of surface and ground water	DNRCD, Division of Environmental Management
2. Water Quality	
Farmers Home Administration	
Rural waste water Facilities planning and construction grants and construction loans to local agencies	DNRCD, Division of Environmental Management, Environmental Planning Section
Economic Development Administration	
Waste water disposal facilities, grants and loans to local agencies	DNRCD, Division of Environmental Management, Environmental Planning Section

TABLE III-4(cont.)

Federal Programs	Primary State Cooperating Agency
Environmental Protection Agency	
Planning grants to States and regional agencies; Section 208 areawide planning; Section 201 Step 1 planning; water quality management program to States	DNRCD, Division of Environmental Management, Environmental Planning Section
Waste treatment construction grants to local communities	
Dept. of Housing & Urban Development	
Community development grants for waste-water facilities	DNRCD, Division of Environmental Management, Environmental Planning Section
Geological Survey	
Determination of surface- and ground-water quality, pollution levels and trends	DNRCD, Division of Environmental Management
3. Flood Damage Reduction	
Corps of Engineers	
Planning Construction of flood control works	DNRCD, Division of Environmental Management, Comprehensive Water Planning Branch; Office of Public Works
Dept. of Housing & Urban Development	
National flood insurance: Develop local flood risk maps Underwrite flood insurance	DNRCD, Community Assistance Division
Tennessee Valley Authority	
Flood control services from TVA system	DNRCD, Office of Public Works
Soil Conservation Service	
River basin surveys Watershed planning Watershed project construction	DNRCD, Division of Land resources
Geological Survey	
Determination of flood-prone areas and flood heights and discharges	DNRCD, Division of Environmental Management

TABLE III-4(cont.)

Federal Programs	Primary State Cooperating Agency
4. Erosion and Sedimentation Reduction	
Soil Conservation Service	
River basin surveys Watershed planning Watershed project construction Grants to local soil conservation districts for erosion control	DNRCD, Division of Land Resources, and Division of Environmental Management, Comprehensive Water Planning Branch
Agricultural Stabilization & Conservation Service	
Agricultural conservation programs: Grants to local cooperators for soil conservation practices	DNRCD, Division of Land Resources
Corps of Engineers	
Planning and construction of projects	DNRCD, Office of Public Works
Geological Survey	
Determination of sediment concentration and loads	DNRCD, Division of Environmental Management
5. Land Drainage	
Soil Conservation Service	
River basin surveys watershed planning Watershed project construction Soil conservation operations Resource conservation & development	DNRCD, Division of Land Resources, and Division of Environmental Management, Comprehensive Water Planning Branch
Agricultural Stabilization & Conservation Service	
Agricultural conservation programs: Grants to local cooperators for drainage operations	DNRCD, Division of Land Resources
Geological Survey	
Research on hydrologic effects of land drainage	DNRCD, Division of Environmental Management
6. Navigation	
Corps of Engineers	
Planning, construction, and operation and maintenance of harbors and waterways	DNRCD, Office of Public Works

TABLE III-4(cont.)

Federal Programs	Primary State Cooperating Agency
7. Hydroelectric Power	
Corps of Engineers	
Planning, construction and operation and maintenance of multipurpose reservoirs	DNRCD, Division of Environmental Management, Comprehensive Water Planning Branch; Office of Public Works
Tennessee Valley Authority	
Hydroelectric power in the TVA system	DNRCD, Division of Environmental Management, Comprehensive Water Planning Branch; Office of Public Works
Geological Survey	
Determination of water available for power generation, and effects of hydro projects on downstream flow	DNRCD, Division of Environmental Management
Federal Energy Regulatory Administration	
Planning of hydro power and regulation of licensed hydro power projects	Dept. of Commerce, Public Utility Commission
8. Recreation	
Soil Conservation Service	
River basin surveys Watershed planning Watershed project construction Resource conservation & development involving water-based recreation	DNRCD, Division of Land Resources
Corps of Engineers	
Planning, construction and operation of multiple-purpose projects involving recreation	DNRCD, Office of Public Works
Heritage Conservation and Recreation Service	
Surveys of recreation aspects of water resource projects Land & Water Conservation Fund grants to State and local agencies	DNRCD, Division of Parks and Recreation
Dept. of Housing & Urban Development	
Community development grants to local communities for water-based recreation	DNRCD, Division of Parks and Recreation

TABLE III-4(cont.)

Federal Programs	Primary State Cooperating Agency
9. Fish and Wildlife (Sport & Commercial; Marine & Freshwater)	
Soil Conservation Service	
River basin surveys Watershed planning Watershed project construction, involving fish and wildlife	DNRCD, Division of Land Resources
Corps of Engineers	
Planning, construction and operation of multiple-purpose projects involving fish and wildlife	DNRCD, Office of Public Works
Fish and Wildlife Service	
River basin studies, grants to States for fish restoration and wildlife restoration, direct Federal construction for and management of fish and wildlife resources	DNRCD, Wildlife Resources Division
10. Protection of Areas of Environmental Concern	
Soil Conservation Service	
River basin surveys Watershed planning Watershed project construction involving protection of natural areas, historic and cultural sites	DNRCD, Division of Land Resources
Corps of Engineers	
Planning, construction and operation of multiple-purpose projects involving protection of natural areas, historic and cultural sites	DNRCD, Office of Public Works
National Oceanic & Atmospheric Admin.	
Coastal Zone Management Program: Development grants to States	DNRCD, Coastal Resources Commission & Office of Coastal Resources
Heritage Conservation and Recreation Service	
Wild and scenic rivers, planning Land & Water Conservation Fund grants to States & local agencies	DNRCD, Division of Parks and Recreation
Fish and Wildlife Service	
River basin studies of ecological systems	DNRCD, Wildlife Resources Division

TABLE III-4(cont.)

Federal Programs	Primary State Cooperating Agency
National Park Service	
Studies of scenic, cultural and historic areas of national concern	DNRCD, Division of Parks and Recreation
11. Overall Water Resources Management	
Water Resources Council	
Planning grants to States Grants for operating costs, river basin commissions	DNRCD, Division of Environmental Management, Comprehensive Water Planning Branch
Tennessee Valley Authority	
Water resource planning, general	DNRCD, Division of Environmental Management, Comprehensive Water Planning
Economic Development Administration	
Grants to local agencies for development of water resources and water-related projects other than water supply and water quality	DNRCD, various offices & divisions; Human Resources, Sanitary Engineering Section

agencies and their programs to State agencies and their programs follow the traditional "picket fence" pattern in which Federal agencies with given programs are linked to State agencies with similar programs. Thus, the Environmental Protection Agency and its water quality program is linked to the Division of Environmental Management, and the U.S. Fish and Wildlife Service is linked to the Wildlife Resources Division.

The proliferation of Federal water resource activities as indicated in Table III-4 presents a challenge to the States in terms of coordinating and channelling these activities to serve the States' interests. North Carolina meets this challenge only in part. On the positive side, most Federal activities (except for water supply) are linked to agencies in a single department--Natural Resources and Community Development. On the other hand, Federal water supply programs have strong links both to DNRCD and to the Department of Human Resources. Also, specific Federal activities have direct links to individual divisions, sections and even branches within DNRCD. The primary State link of the U.S. Water Resources Council is with the Comprehensive Water Planning Branch. There is no single focal point within DNRCD where all major Federal water resource programs and activities can be considered from an overall perspective.

State Water Resource Expenditures

Some of the shifts of emphasis in the State's water resource program since 1970 are revealed in expenditure data for these years, as shown in Table III-5. These data are only approximately correct, because precise expenditure information for the listed categories are not available in State records. However, the data are sufficiently accurate to reveal trends.

Table III-6 shows expenditure data for the basic data collection and analysis, planning and regulatory activities. For these activities, expenditures for protection of water supplies and water quality and sanitation, which were $1.2 million in 1970, had reached $3.1 million in 1974 and $6.4 million in 1978, increases of almost 250 percent and 650 percent, respectively, above the 1970 level.

TABLE III-5. SUMMARY OF FUNDING FOR NORTH CAROLINA STATE WATER AND RELATED LAND RESOURCE MANAGEMENT, BY ORGANIZATIONAL UNIT AND ACTIVITY, FISCAL YEAR, 1970-1978

	1970 Actual	1971 Estimated	1972 Actual	1973 Actual	1974 Actual	1975 Authorized	1976 Actual	1977 Authorized	1978 Authorized	1979 Recommended
Department of Human Resources:										
Sanitary Engineering Section										
Water Supply Protection	251,000	277,000	365,000	474,000	619,000	742,000	752,000	1,261,000	1,262,000	806,000[2]
(Federal receipts*)	(22,000	22,000	23,000	33,000	18,000	17,000	9,000	470,000[1]	472,000[1]	NA)
Sanitation (includes shellfish sanitation, small septic tank regulation & other water related inspections)	256,000	249,000	313,000	521,000	398,000	465,000	715,000	760,000	760,000	763,000
(Federal receipts*)	(35,000	33,000	33,000	39,000	41,000	48,000	52,000	62,000	56,000	56,000)
Solid Waste Vector Control	71,000	95,000	113,000	156,000	196,000	228,000	229,000	251,000	251,000	251,000
(Federal receipts*)	(5,000	15,000	--	--	--	--	--	--		--)
Salt Marsh Mosquito Control	491,000	508,000	499,000	509,000	516,000	365,000	567,000	574,000	674,000	674,000
(Federal receipts)	(--	--	--	--	--	--	--	--	--	--)
Dept. of Natural Resources & Community Development:										
Division of Environmental Management										
Water Quality Program	708,000	750,000	1,026,000	1,270,000	2,045,000	2,666,000	2,219,000	2,487,000	4,018,000[3]	NA
(Federal receipts*)	(270,000	265,000	310,000	596,000	1,281,000	1,307,000	1,071,000	1,441,000	3,017,000[3]	NA
Statewide 208 Planning										
(Federal receipts)							--	525,000[3]	1,507,000[3]	
Groundwater Resources Program	343,000	350,000	376,000	381,000	591,000	744,000	708,000	774,000	774,000	777,000
Comprehensive Water Resource Planning	115,000	147,000	169,000	223,000	324,000	371,000	384,000	374,000	279,000[4]	NA
(Federal receipts*)	(80,000	108,000	106,000	80,000	75,000	91,000	105,000	130,000	118,000	NA)
U.S.G.S. Cooperative Program:										
Total State & Federal funds	642,000	664,000	688,000	764,000	868,000	967,000	951,000	1,090,000	1,100,000	NA
Office of Public Works:										
Water Resources Development:[5]										
Operating expenses	27,000	67,000	54,000	78,000	NA	NA	NA	NA	155,000	155,000
Capital authorization	1,000	1,000	2,130	1,000	500,000	500,000	600,000	200,000	1,733,000[6]	2,513,000
Division of Land Resources										
Soil & Water Conservation										
Operating expenses--total	281,000	299,000	300,000	298,000	343,000	404,000	412,000	528,000	529,000	529,000
(Admin.-Small Watershed Program*)	(98,000	99,000	85,000	161,000	79,000	130,000	NA	NA	NA)	
Sedimentation Control	--	--	--	--	45,000	230,000	220,000[7]	220,000[7]	220,000[7]	220,000
Division of Marine Fisheries										
Research and Development	NA	NA	517,000	660,000	704,000	702,000	788,000	858,000	879,000	860,000
Estuarine Management			97,000	105,000	129,000	151,000	109,000	144,000	145,000	154,000
Wildlife Resources Commission[8]										
Wildlife Resources--Operating Expenses	NA	NA	NA	NA	NA	NA	8,424,000	9,287,000	9,260,000	9,389,000
(Federal receipts*)							(1,617,000	1,391,000	1,406,000	1,406,000
(Interagency Wildlife Coordination*)						(78,000	97,000	105,000	106,000	106,000)
Office of Coastal Resources										
Coastal management program, total	--	--	--	--	--	530,000	941,000	1,000,000	1,365,000	NA
(Federal receipts*)	--	--	--	--	--	(300,000	628,000	666,000	1,009,000	NA)

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*Included in totals above.
Data rounded to nearest thousand.

[1] Estimated receipts from Federal Safe Drinking Water Act authorization.

[2] State funds only.

[3] From Division of Environmental Management Program Plan for period July 1, 1977-October 1, 1978.

[4] From Monthly Budget report for the period ending March 31, 1978. Excludes $408,000 for Yadkin-Pee Dee Level B Study.

[5] Data from Office of Public Works letter 8/15/78. Data for fiscal years 1974-77 not available, but best estimate is annual average of $100,000 for the period.

[6] In addition, Coastal Plains Regional Commission & Economic Development Administration grants totalling $3,325,000 for Wanchese Harbor.

[7] Estimated by Division staff. Published data not available for sedimentation control item.

[8] Only a very small proportion of the amounts shown under this category are expended for water resource management.

TABLE III-6. NORTH CAROLINA STATE EXPENDITURES FOR WATER RESOURCE BASIC DATA, PLANNING AND REGULATION *

	Fiscal Year		
	1970	1974	1978
Water Supply & Water Quality			
Protection of water supplies	$ 251,000	$ 619,000	$1,623,485
Water quality & sanitation	968,000	2,443,000	4,778,000
Total	$1,219,000	$3,062,000	$6,401,485
Other			
Ground water resources	$ 343,000	$591,000	$ 774,000
U.S.G.S. Cooperative water resource data	642,000	868,000	1,100,000
Soil and water conservation & sedimentation control	281,000	388,000	749,000
Comprehensive water resource planning	115,000	324,000	279,000
Total Other	$1,381,000	$2,171,000	$2,902,000
TOTAL	$2,600,000	$5,233,000	$9,303,485

*Includes both Federal and State Funds.

Source: Table III-5.

In contrast, expenditures for the "Other" category: ground water resources, U.S.G.S. cooperative water resource data, soil and water conservation and sedimentation control, and comprehensive water resource planning, which were $1.4 million in 1970, had reached $2.1 million in 1974 and only $2.9 million in 1978, increases of only 160 percent and 210 percent, respectively, above the 1970 level. Viewed in another way, 1970 expenditures for these "Other" programs were 52 percent of total expenditures on basic data, planning and regulation, while 1974 expenditures for these "Other" programs were 41 percent and 1978 expenditures only 31 percent of total expenditures. Expenditures for water quality, sanitation and protection of water supplies, under stimulus of the Federal water pollution control and clean water supply programs, had far outstripped expenditures for other water resource programs.

State Water Resource Planning

In Chapter II, the history of the State water resource planning activity was summarized to mid-1975. In this section we summarize the situation for the years 1976-1978.

The Planning Program

The planning program as of mid-1978 consisted of four major elements (DNRCD, DEM, August 1977; 1978):

1. The Water Resources Framework Study;
2. The Federal-State Level B study program;
3. The Special Studies program, including capacity-use and water supply investigations;
4. Planning liaison with Federal, interstate and other State agencies on specific studies and reports.

The Water Resources Framework Study, begun in 1975 and completed in March 1977, was an attempt to provide State policy makers and the general public with a policy guide to decision making. The Study

> is State government's first attempt to provide a comprehensive and up-to-date overview of all important aspects of water resources in North Carolina. It includes our present legislative

> and administrative policies for water resources management with proposed new policies; a survey of water resources needs and problems in the State; alternative combinations of water resource management measures for each river basin; and an interim priority list for water resource projects. The purpose of the study is to bring together all of the specific water resource needs...into a common framework that will guide State actions to meet these needs over the remainder of the century. (DNER, March 1977)

Preparation of the Study was a major activity of the planning staff during the 1975-77 period. Approximately 1600 copies of the Framework report were distributed to Federal, State and local public officials, libraries, and interested private individuals and agencies throughout the State. In addition, some 18,000 copies of an information brochure on the Framework Study were distributed to the citizenry.

Following issuance of the Framework Study, the planning staff began a process of implementing its findings and recommendations. This process included seeking endorsement of relevant State departments, boards and commissions, making necessary revisions in the Study, adoption of the Study by the Governor as the official State Water Resources Framework Plan, and development of specific proposals for legislation needed to carry out the recommendations of the Plan. As of mid-1978, this process had just begun, and the Study had not yet been adopted by the Governor as the official State Plan (DNRCD, DEM, 1978).

The Level B Study Program. In 1976 the DNER applied to the U.S. Water Resources Council for funding for three cooperative Federal-State Level B studies: the Yadkin-Pee Dee River Basin in North and South Carolina, the Chowan-Pasquotank Basins in Virginia and North Carolina, and the Hiwasse-Little Tennessee Basins in Tennessee and North Carolina. A typical Level B study as defined by the Water Resources Council is a near-term and middle-term (20-year) investigation and analysis of water resource problems, needs and alternative management plans for moderately-sized river basins or other water-resource regions. As applied to North Carolina, a Level B study is an intermediate step between the broad statewide Framework Study, and a plan for a specific water resource project or sub-watershed plan. Thus, a set of five or six Level B studies, each covering a river basin wholly or partially in North Carolina, would provide complete coverage of the State.

Federal funding for the Yadkin-Pee Dee River Level B study was provided for Fiscal Year 1977-78; the North Carolina share of Federal funds was $408,000 which was to be expended over two years. Work on the study was begun in the fall of 1978.

The DNRCD contemplated an orderly continuation of Level B planning, involving the start of a new study each year for the next six years until complete coverage of the State was attained (DNRCD, DEM, August 1977). However, as of 1979 the Yadkin-Pee Dee study is the only one that has been funded.

Special Studies. The planning staff undertook two major studies of urgent water resource problems during the 1976-78 period. The first concerned the applicability of the Capacity-Use law to the water resources of the Upper Yadkin-Pee Dee Basin in the light of Duke Power Company's proposal for large-scale consumptive use of Yadkin River water for cooling at the planned Perkins nuclear power plant. The then-Water Resources Planning Branch in October 1976 issued a 116-page report of detailed information on current and future water use in the river basin, which was used by the Environmental Management Commission in determining whether the Capacity-Use Act should be invoked. In this case, the Commission decided that establishment of a Capacity-Use Area for the upper Yadkin-Pee Dee was not necessary (DNRCD, DEM, August 1977).

The second study, completed in August 1977, was concerned with alternative schemes for meeting the rapidly growing water supply needs of the urbanized sections of the Upper Cape Fear River Basin. Options that were analyzed included various combinations of use of local surface water supplies, ground water, interbasin transfer and purchase of water.

As of mid-1978, a second Capacity-Use study was underway for the Sandhills area in Moore County, and studies had been started on the effects on North Carolina of (1) proposed major water supply withdrawals from the Roanoke and Chowan Basins in Virginia, and (2) a proposed hydroelectric power project on the Roanoke River in Virginia. These special studies, which are often done under severe time constraints, require substantial inputs from the limited staff of the Branch (DNRCD, DEM, 1978).

Liaison Activities. The large number of Federal agencies involved in water resource activities in North Carolina makes liaison with these agencies an important and time-consuming responsibility of the planning staff. Aside from coordinating work in Level B study proposals, the planning staff worked closely with the U.S. Department of Agriculture on three special river basin studies, four small watershed projects, and five subregional "Resource Conservation and Development Projects." In addition, extensive liaison work with the Corps of Engineers involved a number of river basin studies, and studies of navigation, flood control and multi-purpose projects (DNRCD, DEM, August 1977). Also, the planning staff cooperated with Federal agency representatives on preparation of materials for the Water Resources Council's National Water Assessment, which was issued in 1978.

Other liaison activities are undertaken with other State agencies on specific studies such as on wild and scenic rivers and with interstate agencies including the Ohio River Basin Commission and the Southeast Basins Inter-Agency Committee. Also, the planning staff was involved in work with a recently established North Carolina-Virginia interstate committee on water problems (DNRCD, DEM, August 1977).

Public Participation

Public participation in comprehensive water resource planning began in 1974 with the establishment of a Citizens Advisory Committee (CAC) for the Neuse-White Oak River Basin. A similar committee was established for the Yadkin-Pee Dee River Basin in 1975. Typically, committee membership, 25 to 30 in number, includes representatives from local governments, COGs, environmental groups, industry, agriculture, the news media and the general public selected from various parts of the basin. Meetings are held quarterly in various parts of the basin; staff services are provided by the comprehensive water resource planning staff of DNRCD.

As of mid-1978, it was proposed to divide the Yadkin-Pee Dee CAC into two 25-member committees, one each for the upper and lower Yadkin Basins, and to form a third committee for the Lumber-Waccamaw Basins, in order to broaden and improve the effectiveness of public participation in the Yadkin-Pee Dee Level B study.

Public participation in the review and revision of the Framework Study was aggressively sought through widespread dissemination of the report of the Study (1600 copies), a descriptive brochure (18,000 copies) a slide-tape program, news releases, State Fair exhibit, and numerous public meetings throughout the State (DNRCD, DEM, 1978).

Basic Planning Data

Basic information for comprehensive water resource planning is collected in a water resources information center which includes extensive files on water resource activities in North Carolina and related publications. Basic rainfall, streamflow and other hydrologic data are kept currently available in the HISARS computer program package at the Triangle Universities Computation Center and water quality data are available from EPA's STORET system. In addition, computer programs are available to the planning staff for reservoir and low flow stream analysis, reservoir routing, regional hydrologic simulation, water quality analysis, and other types of analysis.

The planning staff conducted a comprehensive, statewide industrial water use survey in 1976 and 1977; in addition it is developing a continuous statewide inventory of all public water supply sources and evaluation of their capabilities to provide water during drought periods.

The backbone of the basic hydrologic data system is the continuing State-U.S. Geological Survey cooperative program of water resource data collection and analysis which includes data on streamflows, flood peaks, chemical water quality, ground water quantity and quality, sedimentation, and special local flood stage and discharge analyses for flood insurance purposes (DNRCD, DEM, August 1977).

Related Water Resource Planning

Water Quality Planning

As mentioned earlier, the comprehensive water resource planning activity is only one of several important water planning programs in the State government. In fact, the largest planning program is that for water quality. The nature and scale of this program was established by the Federal Water Pollution

Control Act Amendments of 1972 (Public Law 92-500), and subsequent amendments and administrative actions. This Act called for three types of water quality planning:

1. river basin planning, conducted by the State, under Section 303(e);
2. areawide planning, either at the metropolitan-regional scale or statewide, under Section 208;
3. project planning of wastewater collection and treatment facilities, conducted by local governments, under Section 201.

The Department of Natural and Economic Resources started Section 303(e) river basin planning in 1973. By 1976 the Division of Environmental Management had completed and submitted to EPA initial plans for all 128 sub-basins into which the State area had been subdivided for this purpose (Moreau, 1977).

Implementation of Section 208 areawide planning was begun by EPA in 1973 by designating the Research Triangle area as the first region in the United States for such planning. A second North Carolina region--Asheville--was designated by EPA in 1974. These areawide plans have been completed by the planning staffs of the Triangle J and Asheville (Region B) Councils of Government. The role of the Division of Environmental Management in these studies was limited to providing information and technical support and to the review of the completed reports for conformance with State law and policy.

In 1975, as a result of a Federal Court order, Section 208 planning was applied statewide by EPA to all areas of States that had not previously been designated. As a result, the Division of Environmental Management's plan for a statewide 208 stduy was approved by EPA for funding in December 1976 (DNER DEM, 1976; DNRCD, DEM, 1978).

The statewide 208 planning activity was a major effort, two and one-half years in duration and involving an expenditure of over $2 million. A special planning staff was organized in the Environmental Planning Section of the Division, and participation of land use and agricultural agencies was arranged through an Agricultural Task Force, with membership from the Division of Land

Resources, N.C. Department of Agriculture, Agricultural Extension Service, U.S. Soil Conservation Service, and the N.C. Grange and Farm Bureau Federation. An interagency planning group was also established, with membership from the Divisions of Forest Resources, Land Resources, Coastal Resources and Community Development, and the Department of Human Resources, Sanitary Engineering Section. Public participation in the planning was given strong emphasis (Stiftel, Herzberg and Godschalk, 1979). Apparently, the Comprehensive Planning Branch of the Division of Environmental Management played no significant role in the 208 planning study.

A draft of the statewide 208 plan was completed in early 1979, and the final plan was scheduled for approval later in 1979 (DNRCD, DEM, 1979).

Coastal Area Planning

The cooperative State-local program of coastal area management involves extensive planning relating to coastal and estuarine land and water resources. The Office of Coastal Resources, DNRCD, assists counties in preparing and maintaining their land use plans, and carries out the planning necessary for State designation of areas of environmental concern. As shown in Table III-7, the Office of Coastal Resources had almost $1.4 million in planning funds for Fiscal Year 1978.

Other Planning Activities

Within DNRCD, other specialized planning programs are:

(1) Small watershed planning, in which State-funded planners participate with U.S. Soil Conservation Service planning teams in formulating small watershed plans involving flood control, erosion control, drainage, agricultural water supply and other purposes. As shown in Table III-7, the Soil and Water Conservation Section, Division of Land Resources had $529,000 in funds for this program in Fiscal Year 1978.

(2) Fish and wildlife aspects of river basin planning, in which the Wildlife Resources staff of the Wildlife Resources Commission conducts such studies, in cooperation with the U.S. Fish and Wildlife Service, on river

TABLE III-7. MAJOR WATER RESOURCE PLANNING AND BASIC DATA PROGRAMS, STATE OF NORTH CAROLINA, FISCAL YEAR 1978

	Amount
1. Comprehensive Water Resource Planning	
Comprehensive Water Planning Branch, Division of Environmental Management, DNRCD	
Regular Program	$279,000
Yadkin-Pee Dee Level B planning (Federal funds)	408,000
2. Water Quality Planning (Section 201, 303(e), and 208 planning)	
Water Quality Planning Branch, Division of Environmental Management, DNRCD	2,000,000+
3. Small Watershed Planning	
Soil and Water Conservation Section, Division of Land Resources, DNRCD	529,000
4. Fish and Wildlife River Basin Planning	
Wildlife Resources Staff, Wildlife Resources Commission	160,000
5. Water Supply Planning	
Sanitary Engineering Section, Department of Human Resources	NA
6. Water-based Recreation Planning (including Wild & Scenic Rivers)	
Division of Parks and Recreation, DNRCD	NA
7. Coastal Area Planning	
Office of Coastal Resources, DNRCD	1,365,220
8. Basic Water Resource Data	
(a) U.S.G.S. cooperative program (State and Federal funds)	1,100,000
(b) Ground Water Section, Division of Environmental Management, DNRCD	NA

NA = Not available

basins or projects under active planning and development by the Corps of Engineers, Soil Conservation Service and other development agencies. As shown in Table III-7, $160,000 was available in Fiscal Year 1978 for this purpose.

(3) Water-based recreation planning, including planning for wild and scenic rivers. The Division of Parks and Recreation in cooperation with the U.S. Heritage Conservation and Recreation Service carries on continuing studies of the recreational, scenic, historic and cultural aspects of water resource plans and programs, with a view toward preserving and enhancing such values.

In addition, the Sanitary Engineering Section, Department of Human Resources is heavily involved in the process of detailed water supply planning for local communities, in its role as reviewer of project and regional program plans from the public health point of view. This involvement in water supply planning has increased significantly since enactment of the U.S. Safe Drinking Water Act in 1974 and subsequent enlargement of State responsibilities for the safety of public water supplies.

Summary on Water Resource Planning

State water resource planning has become a major activity involving annual expenditures of several million dollars. The dominant emphasis continues to be water quality planning, currently through the statewide 208 planning program, and Coastal area planning, in which land and water resource planning are closely linked. Comprehensive water resource planning continues to be under-financed relative to need, although the start of Federally-supported Level B planning via the Yadkin-Pee Dee study represents a significant advance. Specialized water resource planning for small watersheds, fish and wildlife, recreation, and scenic and historic values occurs in different divisions of DNRCD and is only loosely coordinated with comprehensive planning. State planning for flood management is non-existent; the gap is met in part by Federal flood plain information studies and Corps of Engineers and Soil Conservation Service planning.

State planning for water supply is weak and lacks focus; some water demand and supply studies are carried out by the Comprehensive Water Planning Branch while detailed water supply project analyses are done in the Sanitary Engineering Section, Department of Human Resources. There is no significant planning for water conservation. However, the Office of Public Works and the Comprehensive Water Planning Branch have proposed new programs in flood management, water supply planning and water conservation.

Linkages between State water resource planning and sub-State regional and local planning are weak. Aspecial problem exists in relating planning of Council of Government organizations with State water resource planning for water supply, flood management, and water quality. The subordinate location of the comprehensive planning unit within the Division of Environmental Management as of mid-1978 raised difficult problems of coordination of planning and of timely resolution of policy issues. Thus, the Water Resources Framework Study, completed in March 1977, had not yet been officially adopted as a State policy document as of mid-1979. A promising development as of late 1979 was the possible authorization of substantial increase in Federal grants to States for comprehensive water resource planning.

CHAPTER IV

ANALYTICAL APPROACH

From the point of view of administrative theory, planning in the generic sense is only one element, although a crucially important one, of administration or management, public or private. Thus, in State government, planning is an indispensable part of administration or management of State programs and activities, and State water resource planning is an integral part of State water resource management.

It follows, therefore, that water resource planning is not an end in itself. This means that the outputs of water resource planning are not limited to reports of water resource plans for the State as a whole, for river basins or other substate regions or for specific projects. Rather, the useful outputs are represented ultimately by improvements in decisions made by authoritative agencies--policy decisions, program decisions, management decisions, project decisions. Another way of stating this point is that planning without implementation of its results is sterile.

Chapter III provided an overall view of the responsibilities and activities of North Carolina State government in water and related land resources. In discharging these responsibilities, the State has three important purposes: safeguarding the resource, developing the resource, and ensuring equity in access to the resource.

Because water is an essential natural resource to the people of the State, the maintenance of the integrity of this resource is one of the important responsibilities of State government. This safeguarding role is reflected in the laws and programs relating to water quality, ground water management, sedimentation control, and control of consumptive uses. The State's water resources are affected not only by public and private uses within the State--which are subject to State regulation and control--but also by actions of neighboring States and by the Federal government. Interstate coordination of activities is required if each state is to be an effective guardian of its water resources. More difficult is the situation with respect to the Federal government. Historically, the Federal government has controlled the development of navigable waters, whether for navigation or the development of hydroelectric power. More recently, the Federal government has greatly extended its guardianship role over water resources through the permit authorities for point sources of pollution or other discharges into navigable waters under Sections 202 and 404 of the Federal Water Pollution Control Amendments of 1972. Furthermore, Federal water resource project development--by the Army Corps of Engineers, Soil Conservation Service and the TVA--have had and continue to have significant impact on both the quantity and quality of North Carolina's water resources.

The second major role--development--is to see that the State's water resources are managed so as to support the population and economic growth of the State while maintaining and enhancing environmental quality. This obviously includes providing for necessary water supplies to accommodate population growth and expansion of the agricultural and industrial economy. It also includes the dedication of water resources to recreation, commercial and sports fisheries and wildlife, and the maintenance and enhancement of water quality to support all of these uses. In this context, the positive developmental role includes maintenance and enhancement of environmental quality.

A third role of the State is to ensure equity in access to water resources as between various communities and regions of the State, and as between various water users. For example, State water pollution regulations serve to protect downstream users against pollution generated by upstream communities and industries. Also, control of extremely large ground water and surface water withdrawals by individual industries serves to protect the rights of other smaller users and the population at large.

In order to perform effectively as the guardian, developer and equitable distributor of the resource, in cooperation with the Federal government, local governments and the private sector, the State must have a strong capability in planning.

In the most general sense, water resource planning and policy development can be divided into two broad types: strategic and tactical. The first type sets forth the broad outlines of a program and policy, including the directions in which to proceed over an extended period of time; the second type consists of the specific actions to be taken and their sequence to achieve a specific limited or short-term purpose.

A more detailed classification of water resource planning and policy development contains five types:

1. Broad perspective water resources framework studies for the State as a whole and for its major river basins and other water-resource regions such as the coastal and estuarine areas. These perspective studies would have time horizons of 25 to 30 years, and would include projections of available water supplies, demands on the water resources and trends of important water-related problems. Associated with them would be broad statements of current and proposed State water resource policies. These perspective studies would be closely related to alternative projections of State population and economic growth--statewide growth scenarios--developed as a part of State growth policy planning.

These perspective studies are similar in scope and purpose to the so-called Level A studies of the U.S. Water Resources Council, which typically cover major river basins such as the Ohio or Upper Mississippi, or major regions such as the Southeast. Viewed in another way, a North Carolina perspective study could be analogous to a State Assessment, comparable in scope and purpose to the recently completed Second National Assessment of Water Resources required under the Water Resources Planning Act of 1965 (Southeast Basins Inter-Agency Committee, 1977).

The recently completed North Carolina Water Resources Framework Study (DNER, 1977) can be considered as an example of a broad, perspective study, but with special characteristics. Its scope is comprehensive in purpose and statewide. But it focuses on existing problems and demands, and on alternative projects and programs that are currently at hand, rather than on long-range projections of water resource demands and problems based on alternative scenarios.

There is a need for an information base and staff resources to prepare such water resource perspective studies as required as part of a broader State effort of developing and evaluating alternative scenarios of statewide population and economic and social growth, for the purpose of making policy decisions on State growth through the political process.

2. The second major type of water resource planning involves the preparation of relatively detailed sub-state plans for water resource management, usually on a river basin basis, that would involve systematic consideration of alternative ways and means of meeting water demands and solving water-related problems in a multiple objective (economic development and environmental quality) framework. These plans, covering a 15- to 25-year period, would be similar to the Level B studies of the U.S. Water Resources Council, including studies authorized under Section 209 of the Clean Water Act, and would be carried out cooperatively with Federal water resource agencies, and in some cases, with adjacent states. When completed, these river basin plans would provide a basis for evaluating specific proposals for water resource use or control by private interests or by local, State or Federal government agencies. These plans would also incorporate within them or take account of individual single-purpose plans or programs for water quality(as called for under Sections 303(e) and 208 of the Clean Water Act), water supply, flood management, stream sedimentation, and water-based recreation, as these may be undertaken by State, regional or local agencies with or without Federal support or cooperation.

The Level B study for the Yadkin-Pee Dee Basin, currently underway, is an example of this type of planning. Most of the remainder of the State could be covered by a few additional Level B studies--for example, one for the Tennessee River Basin portions of Western North Carolina, one for the combined Cape Fear, Neuse and Tar River Basins, one for the Roanoke-Chowan Basins, one for the Broad-Catawba Basins, and one for the Coastal region.

These plans are considered to be the key elements of a State water-resource planning strategy, and would be the detailed framework within which all single-purpose planning, regulation, and management by local, State and Federal agencies would be undertaken.

3. The third type of State water resource planning consists of the preparation of specific single-purpose plans for water quality, by river basins as required under Section 303(e) of the Clean Water Act, and by problem areas as required by Section 208 of that Act. In some cases, the State may designate a regional agency such as the Triangle J Council of Governments to conduct a Section 208 water quality study (Triangle J COG, 1976). Also included in this category are other single-purpose planning studies, such as for flood management or water supply, that may be undertaken. It should be noted that in recent years the major emphasis on water quality planning has come from the Federal government which has provided substantial planning funds to the State and regional agencies for this purpose. There appears to be a growing awareness at the Federal level of the limitations of the single-purpose planning grants approach, and a move toward emphasizing comprehensive water resource planning grants rather than grants for single purposes.

As noted earlier, the results of the single-purpose planning studies would be incorporated into or taken account of in the Level B type river basin plans as they are formulated.

4. The fourth type of State water resource planning activity involves participating with Federal water resource agencies in specific project or sub-basin planning studies, such as small watershed studies of the Soil Conservation Service, navigation, flood control, or beach erosion studies of the Corps of Engineers, and the like. These studies ideally would be logical follow-ups from, and as a minimum would be carefully coordinated with, Level B type plans discussed earlier. They provide the basis for decisions to undertake specific water resource projects.

Also at the level of project or facility planning is the State technical assistance and oversight of water pollution control facility plans of local governments, prepared under Section 201 of the Clean Water Act.

5. Finally, there are special short-range water resource studies associated with crises such as floods or droughts; or sudden major unanticipated impacts on water resources arising from siting of power plants, development of super farms and major mineral deposits such as phosphates, and establishment of large water-using industrial plants. As the State's planning capability increases, one would expect that such crises could be taken in stride, because advance provision would have been made for ways of handling them.

The most important point to be made concerning the State's role in water resource planning is that the State must attain a position of leadership with respect to the planning and management of its water resources. It must not be in the position of merely reacting to outside stimuli--from Federal development agencies, on the one hand, or major local public or private interests on the other, or, even worse, a combination of Federal government initiative and local government interest in development projects.

Of course, water resource planning funds available to the State are limited, and will continue to be limited relative to the needs sketched above. This means that available resources will have to be used efficiently to undertake the highest priority tasks, and that continued reliance on Federal planning grants will be necessary at least for the next few years. Regardless of budgetary limitations, however, it appears that a program for State water resource planning should have some activity at each of the levels of: (1) broad perspective studies; (2) Level B-type studies; (3) (3) single-purpose planning studies; (4) Federal and Federally-aided project-type studies; and (5) short-term "crisis" studies. These studies should be supported, of course, with a continuing program of collection and first-level analysis of water resource data on supply, uses and water-related problems. Given the recent completion of the Framework Study, and the sizeable program of planning for water quality, including the statewide 208 study, it appears that the highest priority should be given over the next few years to undertaking Level B-type studies to cover the entire State. Pending completion of these studies, special efforts should be made to use the available planning and policy staff on the highest priority Federal project-type and short-term studies. The emphasis should be to allocate the planning resources where they will be most helpful in making good decisions.

With this background of discussion of the State's role as guardian, developer and allocator of North Carolina's water resources, and the various levels and types of planning that are required for the effective discharge of these responsibilities, one can turn to a set of specific criteria that can be used to evaluate the State's activities in water resource planning and to develop a proposed strategy for water resource planning for the State.

Criteria for Effective Planning

In presenting these criteria, it is recognized that water resource planning and policy development are part of a complex pattern of State government activity linked in many ways with Federal, multi-state regional, substate regional, and local programs and activities. Also, such planning and policy making occurs in a setting involving the general public and many special public groups and private interests: local governments, environmentalists, agriculturalists, recreational interests, water-using industries, electric utilities and others.

The specific criteria are in part a function of this complex pattern of formal and informal governments at the State level. They are specific elements of the general criterion of effectiveness which can be stated as follows: the contribution that water resource planning makes to achievement of the short-range and long-range goals of the State as these evolve and are expressed through the political process.

The following specific criteria are stated in the form of questions:

A. Relating to the Outputs of the Planning Activity

1. Scope: Comprehensiveness. Does the State planning activity cover all of the important water and related land-resource elements, purposes and problems in North Carolina? Does it cover all areas of the State? Are the needs for long-range, middle-range, and short-range planning adequately covered?

2. Consistency and Balance. Is the treatment of each specific element, purpose or problem consistent with treatment of the others, given their relative importance to the State? Is the treatment of various geographic areas of the State consistent with their relative importance in terms of statewide water resource problems?

3. Content: Responsiveness to Goals and Specific Objectives. Are the proposed alternative plan or plans derived from the planning activity responsive to State goals and specific objectives as these have been developed through the administrative and political processes?

4. Content: Alternatives. Do the outputs of the planning activity provide realistic alternative plans, programs or strategies for consideration in the decision-making process? Are the economic, environmental and social consequences of each plan adequately assessed and fully presented?

5. Content: Quality of Output. Are the findings, conclusions, alternatives and recommendations based upon adequate data, appropriate analytical methods, and sound analysis and evalaution?

B. Relating to Use of Planning Outputs

1. Timeliness. Have planning outputs been forthcoming and appropriately disseminated in a timely manner in relation to the need for such outputs in decision making?

2. Clarity. Are planning outputs, including alternative proposals, sufficiently clear and specific to be useful in the decision-making and implementation processes?

3. Means of Implementation. Have the means of carrying out plans been adequately considered throughout the planning process and incorporated in alternative recommendations in the planning outputs? Have the views of the implementing agencies been adequately taken into account?

4. Monitoring and Evaluation. Have procedures been set forth in the outputs to monitor the implementation of plans and to evaluate their effectiveness?

5. Effectiveness. To what extent have the planning outputs actually been used in making management and policy decisions in water and related land resources?

C. Relating to the Processes Used in Planning

1. Theoretical Validity. Are the processes used in planning soundly based on accepted and proven scientific principles? Are these principles adequately set forth in manuals or guideline documents?

2. Efficiency. Are the available planning resources allocated efficiently to the various separable yet interrelated tasks involved in the planning activity?

3. Flexibility. Are the planning processes sufficiently flexible so that adjustments in timing, scale and scope of planning can be made if necessary at low cost to the activity?

4. Responsiveness to the General Public and to Special Public Groups. Is the process responsive to the views of the general public and special public groups that may be involved or affected? To this end, has an appropriate strategy and program of public involvement been adopted as an integral part of the planning process?

5. Innovation. Have new and experimental approaches and techniques of planning been tried? If so, have procedures for evaluating them been built into the planning activity?

D. Relating to Organization for Planning

1. Structure. Are the planning activity or activities appropriately located in the organizational structure so as to contribute effectively (1) to water resource management, (2) to the development and adoption of water resource policies, and (3) to the timely making of water resource decisions?

2. Procedures. Are procedures for flow of information, advice, consultation and collaboration throughout the organization well suited to marshall planning resources when and where needed to make decisions, and to make effective use of the outputs of planning activities?

3. Resources. Are adequate resources--funds, qualified staff and support services--available to provide the required planning outputs? Are the qualifications of the planning staffs appropriate for the tasks to be done?

4. Coordination with Other State Programs. Is the water resource planning activity adequately coordinated with (1) State water resource management programs, (2) comprehensive State planning and policy development, and (3) planning and management in other sectors such as land use, transportation, energy, economic development, and other natural resources? Are there effective procedures for resolving conflicts?

5. Linkage with Regional Agencies and Local Governments. Is the activity appropriately linked with, supported by, and supportive of planning activities at the regional multi-county, and local city and county levels?

6. Linkage with Other States and Multi-State Regional Agencies. Is the activity appropriately linked with water and related resource planning activities of other States and with existing regional agencies such as the TVA, Appalachian Regional Commission, Coastal Plains Commission and the Southeast Basins Committee?

7. Linkage with Federal Agencies and Programs. Is the activity appropriately linked with the complex pattern of Federal programs and activities that are concerned with water and related land and other natural resource planning and management?

General Findings

Before providing specific answers to the questions posed in the above list of criteria, a set of general findings relating to North Carolina water resource planning will be presented. Unless otherwise indicated, the status of planning is as of mid-1978, when the research for this report was concluded.

1. Comprehensive water resource planning has made substantial progress in North Carolina in the past ten years, starting from a base of one professional employee in 1967 to a level of seven in 1973 and eight in 1978. Annual planning grants under Title III of the national Water Resource Planning Act of 1965 have served as an effective stimulus, especially in the early years.

2. Growth of the activity was most rapid in the first five years when comprehensive planning was an integral part of the water resources agency (until 1972, the Department of Water and Air Resources; in 1972-73, the Office of Water and Air Resources in the new Department of Natural and Economic Resources). Since 1974, when comprehensive water resource planning was combined with other resource planning activities into a separate Division of Resource Planning and Evaluation, growth of the activity has levelled off.

3. State water quality planning has historically been an activity separate from comprehensive water resource planning. Since water quality planning activity began in 1952, it has always had separate State funding at a level considerably higher than other State water resource planning. Since enactment of Public Law 92-500 in 1972, Federal planning grants (for Sections 201, 303(e) and 208 planning) and regulatory stimulus have greatly expanded State water quality planning, so that the current level of activity (about $2 million in F.Y. 1978) is several times that of State comprehensive planning.

4. During the first five years, comprehensive planning activity was directed toward preparing the first draft (known as the "Progress Report Series") of a comprehensive North Carolina State Water Resources Plan. Because of staff limitations and pressure of other work, only 25 of the 61 chapters of the Progress Report Series of the Plan had been prepared when work on the Plan was suspended in 1974.

5. Since 1973, a strategy emphasizing preparation of short-range planning reports useful for making policy has been adopted. The strategy currently has two major aspects: (a) the North Carolina Framework Study, started in the spring of 1975 and completed in 1977; and (b) Level B planning. In June 1974, an unsuccessful attempt was made to obtain Water Resources Council financing for a Level B study covering the entire State, but in 1977 the State was successful in obtaining funds for a Level B study of the Yadkin-Pee Dee River Basin which began in late 1978 and is being conducted with South Carolina and the Water Resources Council.

6. Since 1974, water resource planning in North Carolina has been significantly affected by EPA's Section 208 water quality planning program. In 1974 two areas--the Triangle J area and the Asheville area--were designated for 208 planning, and over $2 million of 100 percent Federal funds were provided by EPA to area-wide planning agencies in these areas over a two-year period. By 1976, 208 planning had shifted to a statewide basis, and since early 1977 a statewide 208 planning activity has been underway, with Federal funds of about $2 million, provided on a 75 percent matching basis.

7. The rise of environmental quality as an important national objective has had unanticipated adverse consequences on North Carolina's capability for effective water resource planning and management. Because historically Federal water resource activity in North Carolina--primarily through the Corps of Engineers, SCS and TVA--had stressed development projects--dams, reservoirs, stream channelization--and because these came to be considered threats to environmental quality, since the early 1970's water resource planning and management were not given a high priority at the State level. A move to expand comprehensive water resource planning in 1974 by providing

funds for six new staff positions was thwarted by assignment of these positions to other activities in the Department of Natural and Economic Resources.

8. In reorganization decisions since 1972, overall water resource management was de-emphasized relative to water quality management and other environmental quality programs. Specific water resource programs and activities were scattered throughout various offices in the Department of Natural and Economic Resources. In this process, some extremely important State responsibilities for flood management, regional water supply, surface and ground water allocation were slighted at the very time that problems in these fields were becoming increasingly serious.

9. As of mid-1978 State organization for water resource management was fractionalized--both within and outside the Department of Natural Resources and Community Development. The historic division of water supply and water pollution control responsibilities between the Departments of Human Resources and Natural Resources and Community Development was becoming a more significant issue as new Federal programs such as the Safe Drinking Water Act of 1974 were taking effect. Within DNRCD, important water resource and water-related programs were located in the Division of Environmental Management, Division of Land Resources and the Secretary's office. The Division of Environmental Management, which had the greatest share of these activities, has a strong environmental quality emphasis--oriented toward regulation of water and air quality--and, unless its policy and program directions were to be changed, would not appear to be an ideal administrative niche for overall State water resource management.

In July 1979, the Department reorganized the water resource planning and development functions of the Department as follows:

(a) A new Water Planning and Development Section was established in the Division of Environmental Management, representing an upgrading and broadening of responsibilities of the previous Comprehensive Water Planning Branch.

(b) An Office of Water Resources was established at the Assistant Secretary for Natural Resources level, with a coordinating and policy development role.

(c) A Water Resources Management Committee, composed of NRCD Division Directors with water resource interests, was established to coordinate water resource activities and policies within the Department.

(d) An inter-departmental North Carolina Water Resources Council was established with membership from the Departments of Agriculture, Commerce, Human Resources, Natural Resources and Community Development, and Administration, to serve as the coordinating body for water resources throughout State government.

The Office of Water Resources provides staff services to the Water Resources Management Committee and the Water Resources Council.

10. As of mid-1978 the water resource planning activity was not appropriately located in the organizational structure. Comprehensive water resource planning was too remote from policy making--it existed as a Planning Branch, in a Planning and Management Section, of the Division of Environmental Management within DNRCD. In contrast, the State Planning activity, with which it must interact, is a major program in the Department of Administration, with easy access to the Governor's office.

As noted above, in mid-1979 the comprehensive water resource planning activity was elevated to the Section level in the Division of Environmental Management, and access to policy making was improved by establishing an Office of Public Works at the Assistant Secretary of DNRCD level, and the two coordinating bodies: Water Resources Management Committee and Water Resources Council.

11. With the possible exception of water quality, State water resource planning is underfinanced in terms of the needs. In the absence of Federal stimulus, the State has not provided adequate planning funds for the important areas of flood management, regional water supply, allocation of surface and ground waters to competing uses, and interstate water problems. Also, funds for overall water resource planning have not been increased in relation to needs. Federal funds made available to the State under the Yadkin-Pee Dee Level B study will help, but they are of only two-year duration.

12. The net effect of Federal water resource and environmental quality policies and programs over the past five years has had a distorting effect on North Carolina water resource planning. The dominant emphasis on water

quality planning, constructon and regulation, while contributing significantly toward improving the quality of the State's water resources, has served to inhibit the State from dealing effectively with other important water resource problems.

13. The Federal-State Coastal Zone Management Program and the evolving statewide Land Classification program are seen as potentially compatible with a fully effective State water resource planning activity. The evolving North Carolina Framework Study and Level B studies provide a good basis for relating activities under these programs to State water resources management.

Specific Findings

A. Outputs of the Planning Activity

Scope: Comprehensiveness. From its beginnings in the mid-1960s, State water resource planning has been conceptualized as comprehensive in both purpose and geographic area. Recent planning outputs such as the Framework Study are comprehensive in purpose and geographic area. Currently, middle-range and short-range planning are being emphasized. With the limited resources available, this emphasis is probably appropriate, although long-range planning needs are not now being adequately met because of insufficient staff.

Consistency and Balance. As discussed above, planning effort has been unbalanced relative to importance to the State. Flood management, regional water supply and water allocation planning have been underemphasized; only water quality planning approaches adequacy in relation to need. In terms of geographic area, planning effort has been underemphasized in the Piedmont and Mountain areas; only in the Coastal Zone is it reasonably adequate in relation to need.

Responsiveness to State Goals. In the Framework Study, an attempt was made to relate the proposed river basin alternatives to State goals and policies. However, when the study was issued in March 1977, the State growth policy of the Hunt administration was just beginning to be developed. With enactment of the Governor's Balanced Growth Policy Act (Ch. 412, H. 874) in the 1979 Legislative Session, it is now possible to tie revisions of the

Framework Study and other water resource planning and management actions directly to the Balanced Growth Policy.

Alternatives. The Framework Study attempted to follow the U.S. Water Resources Council guidelines by presenting three alternative proposals for each major river basin in the State. Also, the Level B planning study for the Yadkin-Pee Dee River Basin is expected to generate alternative plans for consideration by decision makers. The statewide 208 planning study is also developing alternative programs and strategies for handling non-point sources of water pollution. In each of these studies, realism appears to be an important criterion for selection and recommendation of plan elements.

Because the Framework Study was a comprehensive activity accomplished in a relatively short period of time, the economic, environmental and social consequences of the river basin alternatives are presented only in sketchy form. More detailed assessments of these consequences are required before decisions are taken on individual projects or other elements of these alternatives.

Quality of Output. Limitations of staff resources available for preparation of the Framework Study have affected the quality of the study output. In some instances, the findings, conclusions, alternatives and recommendations of the Study are inadequately supported by data and analysis, especially of an economic nature. In general, physical data and analysis are more complete and satisfactory than economic and social data and analysis, reflecting the backgrounds and competencies of the planning staff.

B. Use of Planning Outputs

Timeliness. Until completion and dissemination of the Framework Study in early 1977, the major planning outputs were not available in time to be very useful in decision making. Since then, high priority has been given to providing timely outputs to the extent possible with available planning staff.

Clarity. Alternative proposals presented in the Framework Study are clearly stated but, given the summary nature of the Study, are sometimes not specific enough to be fully useful in decision making. For many elements in the Framework Study, further analyses are needed.

Means of Implementation. In general, the summary nature of the Framework Study precludes much detailed consideration of means of implementation. For many projects included in the river basin alternatives, implementation by Federal or local agencies is straightforward; for other elements such as flood plain management and sedimentation control, implementation is a serious problem. In general, the implementation aspect of water resource management needs to be related more closely to the planning aspect, and the views of implementing agencies need to be given greater consideration in plan preparation.

Monitoring and Evaluation. There appear to be no procedures established or steps taken to monitor the implementation of overall water resource plans and to evaluate their effectiveness. Monitoring activities are undertaken in State water quality planning and management, but there is little or no monitoring or evaluation of completed small watershed projects, flood control, or water supply projects or programs.

Effectiveness. Prior to 1973, few of the overall water resource planning outputs were actually used in management and policy decisions, but since that time outputs have become considerably more useful. Redirection of the planning activity to emphasize short-term and medium-term planning, typified by the Framework Study, has been in part responsible. Effectiveness has been impaired until very recently, however, by the relatively low status and priority given to overall water resource planning.

C. Planning Processes

Theoretical Validity. Planning is based on application of the "rational planning model," set forth in the Water Resources Council's Principles and Standards. Through in-service training of staff, attempts are made to keep abreast of latest developments in planning and systems analysis approaches.

Efficiency. Because of the many competing requirements placed on a small staff and because of frequent administrative and program changes, it has been difficult to allocate the available planning resources in a fully efficient way. There is evidence that the situation is now improving.

Flexibility. Because of the changing requirements placed on the planning unit, flexibility has been especially important. The unit adjusted well to the requirements for a Framework Study for a Yadkin-Pee Dee Level B study. However, administrative constraints and inadequate resources have made it difficult to make the needed adjustments in timing, scale and scope of planning.

Responsiveness. The planning unit has adopted a strategy for public participation that includes use of Citizens Advisory Committees in major river basins of the State. Two such committees were established in 1974 and 1975, and one of these--the Yadkin-Pee Dee Committee--is being used in current Level B planning for the Yadkin-Pee Dee Basin. Also, in the statewide 208 planning study, a strong public participation element has been developed (Stiftel, Herzberg and Godschalk, 1979).

Innovation. The planning activity has not been especially innovative; because of time and resource constraints, reliance has been placed on approaches and techniques that were already well developed. Opportunities for innovation may become available as these constraints become less severe.

D. Organization for Planning

Structure. As discussed under General Findings, as of mid-1978 the planning activities were inappropriately located in the organizational structure and were therefore not fully effective in contributing to water resource management and policy making. The reorganization of July 1979 was directed at correcting this inadequacy.

Procedures. Primarily because of the organizational inadequacies, as of mid-1978 procedures for flow of information, advice, consultation and collaboration were not well adapted to make effective use of planning outputs. In spite of organizational constraints, however, a considerable degree of informal consultation and collaboration on planning and policy matters exists throughout DNRCD.

Resources. As discussed under the General Findgs above, resources of funds, qualified staff and support services are inadequate, except in the field of water quality. Because of limited resources, the planning staffs do not have all of the types of expertise required for the tasks to be done. Economic expertise is especially lacking.

Coordination. In part because of organizational deficiencies, in part because of limited staff, coordination of water resource planning with other sectors of State government is inadequate. As of mid-1978, procedures for resolving conflicts were ad hoc in nature, depending ultimately on intervention or participation of the Governor's policy staff.

Regional and Local Linkages. The opportunities for linking State water resource planning with regional and local government agencies have not been adequately exploited. Inadequate use has been made of the link between the multi-county COG agencies and local governments.

Interstate and Multi-State Linkages. Links with agencies such as the Southeast River Basins Committee, Appalachian Regional Commission and Coastal Plains Commission have been developed and are used to the extent that resources permit. Bi-state links with Virginia and South Carolina are being developed to deal with specific water issues in the Roanoke and Chowan Basins, and in the Yadkin-Pee Dee Basin, respectively. These linkages will be strengthened in the future.

Federal Agency Linkages. For overall water resource planning, direct links have been primarily with the Water Resources Council, the Army Corps of Engineers, Soil Conservation Service and the TVA. As discussed in Chapter III, Federal-State agency linkages over the entire field of water resources are extremely complex. Direct ties between Federal agencies such as EPA and State agencies such as the Division of Environmental Management are the rule. There is no single point in the State administration where these Federal links are brought together.

CHAPTER V

A PROPOSED STRATEGY FOR WATER RESOURCE PLANNING IN NORTH CAROLINA

The strategy proposed here consists of changes in (1) organization and administration of State water resource activities, (2) the program of planning for water resources, and (3) the methodology for water resource planning, as well as suggestions for a procedure for carrying out the changes proposed.

Organization and Administration

It is proposed that a strong State water resource management unit be established independent of the regulatory emphasis now dominant in the Division of Environmental Management. Included in this unit would be State responsibilities for flood management, water supply, ground water, surface and ground water allocation, sedimentation control, navigation, hydroelectric power, and collection and analysis of basic water resource data as well as for overall water resource planning and policy development. This unit could be established as a separate Water Resources Division in DNRCD or as a major unit in the Division of Environmental Management.

With respect to water resource planning, capability for planning should be available at several different levels of administration. Thus, there will be need for water resource planning inputs to the overall growth policy and planning activities in the Department of Administration and the Governor's office, as well as to policy and planning activities of other Departments that may have water resource implications. Examples are energy, transportation, agricultural and economic development plans and policies.

In addition, the Secretary of DNRCD will need water resource planning inputs for activities involving other programs of the Department including Forestry, Parks and Recreation, and Community Assistance. These needs could be met by a small water resource policy staff either at the Secretarial or Assistant Secretarial level in DNRCD or attached directly to the Director of a new Water Resources Division.

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The principal planning capability would be in the central water resource planning staff which would be an important separate entity in the water resource management unit. This staff would have the lead responsibility on all major aspects of water resources planning--both strategic and tactical, long-range and short-range.

There would be some planning capability in the individual program areas --small watersheds, water supply, and especially in water quality. But planning activities in these areas would be closely identified with the overall water resource planning activity. For example, the central water resource planning staff would rely upon these specialized staffs for information and guidance in their specific fields and, in turn, the core water resource policy staff would rely heavily on the resources of both the central and specialized water resource planning staffs.

With respect to water quality, planning under Sections 303(e) and 208 of the Federal Clean Water Act could either be a part of overall water-resource planning, or it could remain as a separate activity in the Division of Environmental Management. In any event, it is extremely important that water quality planning be closely coordinated with overall water resource planning; but it is also important that the currently large water quality planning program not dominate overall water resource planning. Also, it is important for all aspects of water resources that the planning activity be kept close to implementation. This is an important consideration in decisions on organization for water resource management whether inside or outside of a Division of Environmental Management.

Program of Planning

Planning is viewed as an aid to water resource management, including the making of decisions on broad policy, on programs, on specific projects, and on the means of implementation, including financial incentives, technical help, and regulations. Accordingly a program of water resource planning will have many facets. The following specific elements are identified as essential.

1. A statewide assessment of water resources, demands and problems analogous to the National Assessment. This assessment would be prepared every four or five years and would be used as a basis for developing State water policy and preparing needed legislation, and for information of water resource implications of State growth policies as these are developed. The current Water Resources Framework Study includes much information that would be part of such an assessment.

2. A statewide water resource policy-problem-program-alternatives report, to serve as a reference document for all of those concerned with water resource issues, and especially for decision makers. This report, which is analogous to the current Water Resources Framework Study, would be kept current, with revisions made as required from time to time. Every four or five years, the report might undergo a major revision, but the report's basic purpose would be as a tool for policy development and decision making.

3. Intermediate, medium-range water and related land resource plans, carried out on a sub-state regional basis, either by major river basins, by groups of basins, for the coastal area or for selected urban regions. These plans would rely largely on existing data and analyses, and would provide estimates of available surface and ground water resources, and existing and projected demands on these resources, and would formulate alternative plans and strategies for water resource management. Each planning activity would cover about two years. An orderly program and schedule of completing such plans for the entire State would be prepared; the aim would be to obtain complete coverage by ten years.

   The current Level B study of the Yadkin-Pee Dee River Basin is an example of such an intermediate level plan. Any future Federal river basin plans by the Corps of Engineers or SCS affecting North Carolina would be required to fit into the State's program or schedule. In the absence of Federal interest in such plans, the State would be prepared to undertake them on its own.

4. Single-purpose or limited-purpose plans, either of a statewide nature or covering a limited region such as a small watershed, an area subject to flood damage or a navigation reach. Although the degree of State involvement in such planning will vary with the specific circumstances, as a minimum the responsible State water resource agency should have a voice in the scheduling of such planning and in the way it is carried out.

   Examples of statewide limited-purpose planning are statewide water quality planning under Sections 303(e) and 208 of the Clean Water Act. Examples of sub-state planning are small watershed plans of the SCS and local soil conservation districts, navigation or flood control project plans of the Corps of Engineers, and planning under the N.C. Coastal Management Act and the U.S. Coastal Area Management Act.

Although the State should take advantage of Federal initiatives in water resource and related programs to advance its plans and programs for water management, it should resist any major distortions of its plans by such Federal initiatives.

5. Special planning studies that are required from time to time to deal with emerging problems and issues or with crisis situations arising from floods and droughts, for example. Examples of such studies are:

   (a) interstate water problems in the Chowan River Basin, Virginia and North Carolina;
   (b) identifying potential points of conflict between water supply and demand and developing alternative solutions to these problems;
   (c) planning a statewide flood management program;
   (d) planning a statewide regional water supply program;
   (e) planning a statewide water-allocation system for both surface and ground waters.

   Such special studies would often be undertaken in cooperation with the work of legislative research committees, to provide the factual basis for legislation. Ideally, such studies could be scheduled well in advance of emergence of a crisis, so that ad hoc, hasty responses to crises could be avoided.

Obviously, all of these types of planning would not be the sole responsibility of a central water resource planning staff. Water resource planning capability should be located in a number of different units, including water quality management, water supply, ground water, coastal management, fish and wildlife management (both inland and coastal), sedimentation control, and small watershed development, as well as in the central unit. Under the best of circumstances, planning resources will be limited in relation to needs, so that it will be essential that these water resource planning staffs work together effectively. The central water resource planning staff can serve as the lead agency in some planning activities, such as the intermediate water resource plans, as the coordinating agency on single-purpose or limited-purpose plans, and as the convenor for discussion of water and related land resource planning and policy issues that span the interests of many agencies. Especially important would be close cooperation between water resource planning and the coastal management activity and statewide land classification and policy activities in DNRCD.

Planning Methodology

The central water resource planning staff, and the specialist water resources planners in other administrative units, should share a common approach to planning based on application of the scientific method and the use of the rational planning approach. This approach has the following important characteristics:

1. It is goal oriented. It seeks to determine what the State's broad goals and specific program objectives are, and provides timely information and analysis to help in the definition of such goals and objectives. It seeks to develop policies, programs, projects and implementation means that will best meet these goals and specific objectives.

2. It is multi-objective in nature. Water resource planning seeks to achieve balance among environmental quality, economic development, and equity objectives, rather than being primarily concerned with development. Thus it is consistent with the Water Resources Council's approach as set forth in its Principles and Standards, and with the new water policy proposed by President Carter.

3. It emphasizes the application of sound economic principles, involving considerations of least cost, maximum net benefits, and marginal analysis, as set forth in Principles and Standards, based upon the theory and practice of benefit-cost and cost-effectiveness analyses. The application of these principles would be adapted to the local planning situation.

4. It emphasizes the practical application of systems analysis methods and techniques, including adapting the computer-based water quantity and water quality surface and ground water models to the North Carolina situation. These methods and techniques are to be put to the service of water resource planning and management, and are not ends in themselves.

5. It emphasizes the adaptation to the North Carolina situations of the best available methods of environmental analysis, based on sound scientific criteria.

6. It is innovative in its approach to planning, taking advantage of new methodologies as they evolve, allowing some scope for

experimentation, and maintaining close relationships with the research community, through the North Carolina Water Resources Research Institute.

7. It has a strong commitment to involving the public in the planning process, in realistic and effective ways that draw out and use public inputs without unduly complicating the work of planning.

8. It gives strong emphasis to implementation, by organizing planning activities so that they contribute effectively to decision making and management, and by including feasibility criteria in the development of water resource plans and programs.

9. It develops strong linkages with planning and policy development in other sectors of State government--land use, transportation, agriculture, energy, economic development--as well as with sub-state regional agencies, as appropriate.

10. It develops strong linkages with water resources basic data and planning staffs of Federal agencies, including the Corps of Engineers, Soil Conservation Service, TVA, Geological Survey, and Fish and Wildlife Service, and of adjacent States. Studies such as the Yadkin-Pee Dee Level B activity enable such linkages to be developed.

Procedure for Carrying Out a Strategy

Basic organizational decisions on water resource management must precede taking any specific steps to improve water resource planning. Such decisions may involve major changes or may make only minor organizational shifts. Organizations obviously change over time; it is important, however, that once changes are made the resulting pattern be allowed to remain fixed for an adequate period to allow a fair test of its effectiveness.

An important part of establishing the water resource management organizational structure is locating the planning activities within that structure. These decisions should be taken at the time that decisions on overall structure are made.

A program of planning activities should be developed, and estimates should be made of the resources (personnel, funds) required to carry them out. Because existing resources are likely to be inadequate to carry out these activities, a schedule of build-up of resources should be prepared, for approval ultimately by the Governor and the Legislature through the budgetary process.

A flexible strategy should be developed to take advantage of emerging opportunities of obtaining additional planning funds from the Federal government. However, a strong attempt should be made in any event to increase the State's financial commitment to water resource planning.

The crucial role of high-quality planning personnel should be recognized in staffing and managing the planning units.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

General Conclusions

1. North Carolina water management is currently in a state of transition from a historic development-oriented mode that relied largely on Federal leadership through the Corps of Engineers and the Soil Conservation Service, that was superseded in the early 1970s by an environmental quality-oriented water pollution control mode dominated by strong pressure from EPA. The State has not yet developed an independent stance and strategy that reflects an appropriate balance between the problems and needs of water quantity and quality, flood management, control of sedimentation and interstate water management.

2. Federal government influence continues to have a distorting effect on State water management. This is because the strong Federal pressure on water pollution control is not accompanied by equivalent Federal intervention in allocation of surface and ground waters among competing uses (a recognized State responsibility), nor in strong Federal leadership in flood management and sedimentation and erosion control. Although the water resource policy of the present Federal administration proposes some remedial measures, such as increased Federal grants for comprehensive water resource planning and water conservation planning, the policy also looks to the States to provide the leadership in these fields.

3. The State has a special responsibility to plan and promote effective management of the State's surface and ground water resources in both their quantity and quality dimensions. For obvious hydrologic reasons, this task is beyond the scope of local jurisdictions and private interests because of the externalities involved. Under Federal pressure, the State has reasonably adequate legislative authority and planning and management control over water pollution from point sources, but lacks equivalent legislative authority and planning and management capability for non-point sources of water pollution and for water quantity management of both surface and ground waters.

4. The water resource problems identified in this report and the references cited in it dramatize the need for improved State leadership and capability for overall water management. Little time is left before the crises become too frequent and too great to allow the State to plan ahead to be prepared to deal with issues before they reach the crisis stage.

5. Existing State water resource planning and management resources, including personnel, although inadequate to the needs, are not effectively mobilized. Resources are divided between two departments--Natural Resources and Community Development and Human Resources--with each Department sharing both water supply and water pollution control planning, promotion and regulatory responsibilities. Within the Department of Natural Resources and Community Development, staff resources have also been diffused; in addition, primary program emphasis has been on water pollution control, reflecting the strong Federal pressure for this program.

6. Although a strong and effective State water management program must involve both water quantity and water quality aspects, in the short run it is necessary to provide an effective way for the water quantity and related flood management responsibilities to grow and develop free of the dominant emphasis on water quality. It seems appropriate that this water management capability be developed within the Department of Natural Resources and Community Development.

Specific Program Conclusions

1. Water quantity management, including effective means for allocating surface and ground water among competing needs, is the most important unresolved water management issue in North Carolina. Included are issues of withdrawals from streams, lakes and underground aquifers, and issues of releases from lakes and reservoirs to maintain water levels and provide minimum flows for in-stream uses.

2. North Carolina water allocation laws, including the State "Capacity Use Law," are deficient with regard to adequate State control of surface and ground water withdrawals and lake and reservoir releases. The laws and

associated permit systems provide insufficient guidance on (1) questions of due process or just compensation when users are directed to reduce or discontinue withdrawals, (2) how to determine priorities among competing users or allocation rules to follow in times of emergency or drought, and (3) how to prevent or resolve future water use conflicts. Furthermore, by restating the primacy of riparian rights, the legislation leaves unresolved many questions on allocation of surface waters, including transbasin diversions.

3. Administration of the "Capacity-Use Law" and related legislation is also deficient. Clear assignment of responsibility and adequate staffing for carrying out the provisions of these laws have been lacking; especially lacking have been resources for continuing studies of water allocation issues to anticipate problems before they arise.

4. Inadequate attention has been given to the increasingly important interstate water management problems, especially with the State of Virginia. There is need for the State to establish legal, policy and administrative guidelines to deal effectively with these issues.

5. The Floodway Regulation Act is not being administered by the State because of lack of funds and, until recently, no clear-cut assignment of administrative responsibility. The Act needs to be revised to bring it in line with current Federal flood management legislation. Unless the State adopts a strong flood damage reduction strategy, it will face increasing probabilities of losses of life and property.

6. Administration of the Sedimentation Control Act is hampered by limited staff resoures, by the exclusion of agriculture, forestry and mining activities from control under the Act, and by weak incentives for strong local administration of the Act.

7. There is no emphasis in State law and policy on conservation of surface and ground waters as a complementary water management measure. There is need for a vigorous State water conservation program as an integral part of State water management. The evolving new Federal water resource policy places strong emphasis on water conservation.

Conclusions on Planning

1. Progress in comprehensive water resource planning since 1973 has not kept pace with the needs. Furthermore, in reaction to Federal pressure for water quality planning, the imbalance between comprehensive planning and water quality planning has increased. The current level of activity of water quality planning (approximately $2 million in fiscal year 1978) is several times that for State comprehensive planning.

2. The recent recognition by the State of the increasing importance of comprehensive water resource planning has yet to be fully translated into action. The start that was made in 1979 of revamping the comprehensive planning activity within DNRCD needs to be pursued aggressively in order to take maximum advantage of the increased Federal support for comprehensive planning that appears to be forthcoming.

3. The current emphasis on updating the N.C. Water Resources Framework Study and preparing cooperative Federal-State Level B Plans for major river basins is appropriate. However, inadequate attention is being given to statewide planning for flood management, water supply, water conservation and interstate water issues.

These broad conclusions on water resource planning are supplementary to the General and Specific Findings on Planning found in Chapter IV.

Recommendations

General Recommendations

1. There should be a major restudy of existing water allocation law and consideration of alternatives to correct existing deficiencies. Alternatives could range from strengthening the "Capacity-Use Law" to a comprehensive statewide permit system for water use.

2. Legislation should be enacted (1) to protect instream uses by providing controls over lake levels and minimum releases from reservoirs, (2) to clarify State law and policy on trans-basin diversions, and (3) to provide authorization and guidance to administrative agencies on interstate cooperation in water resource management.

3. The Floodway Regulation Act should be revised to make it consistent with recent Federal legislation on the flood insurance program and to relate it more closely to related legislation on zoning and programs of flood hazard reduction and storm water management.

4. The Sedimentation Control Act should be reviewed for possible amendment to carry out the objectives for reduction of non-point source pollution contained in the report on the recently completed statewide Section 208 study.

5. Legislation should be enacted re-defining State policy on cost-sharing of water resource projects, taking appropriate account of the specific recommendations of the State administration and the Legislative Review Commission Study Committee. Objectives should be to assure that State supported projects are economically sound, that costs are shared equitably and that projects are operated and maintained locally.

Recommendations on Organization

1. A strong State water resource management unit should be established in the Department of Natural Resources and Community Development independent of the strong water quality regulatory emphasis that has been dominant in the Division of Environmental Management. Included in this unit should be State responsibilities for flood management, water supply, ground water, surface and ground water allocation, sedimentation control, navigation, hydroelectric power, collection and analysis of basic water resource data, and overall water resource planning and policy development.

2. This water management unit could be established as a separate Water Resources Division in DNRCD or as a major sub-unit of the Division of Environmental Management. The major requirements for effectiveness are strong leadership and separate identity for the water management program.

3. Further consideration should be given to the transfer of water management activities now in the Department of Human Resources, including water supply, water pollution control, to DNRCD; in such transfer, the important role of DHR in protecting the public health should be preserved.

Pending such transfer, strong coordination of the water management activities of DNRCD and DHR (along with the water-related activities of other departments) should be effected through an interagency group with DNRCD leadership, such as the recently-established N.C. Water Resources Council.

4. Specific recommendations on organization for water resource planning are given below under Recommendations on Planning.

Programmatic Recommendations

1. Pending new legislation on water allocation, DNRCD should institute a water quantity management program, combining policy, planning, basic data, and regulation aspects. This program should pull together the current diverse water quantity management activities under the Capacity-Use Act, Coastal Zone Management Act, ground water legislation and various water supply acts. This program should be a high-priority activity of the new water resource management unit in DNRCD. Adequate personnel and supporting funds should be allocated to, or requested from the Legislature for, this activity as soon as feasible.

2. The DNRCD should strengthen and expand its current activites on interstate water management especially as related to the State of Virginia, using the recently-established Water Resources Council as the means to develop a unified State policy and action program.

3. The DNRCD should expand on its beginnings of establishing a State flood management program that will take maximum advantage of Federal flood insurance and other flood management programs, and that will emphasize intergovernmental coordination and technical aid to local governments. This program should be an important responsibility of the new water resource management unit in DNRCD.

4. Pending revision of the Sedimentation Control Act, the State should strengthen its program of technical aid and regulation under the existing Act. This program should also be an important responsibility of the new water resource management unit, but will necessarily involve parti-

cipation from other units in DNRCD such as the Division of Land Resources and elsewhere in State government such as the Department of Agriculture.

5. The DNRCD should establish a new program of water conservation in the water resource management unit, to conduct research, provide technical help to local communities, and disseminate information on ways and means of conserving water and reducing water demands. The program should be established in anticipation of a Federal water conservation program of aid to States and localities which has been proposed by the national administration.

Recommendations on Planning

Organization

1. Regardless of the precise organization for water resource management, capability for water resource planning should be available at several different levels of State administration. The major planning capability should be in a central water resource planning staff which would be an important separate entity in the water resource management unit. This staff would have the lead responsibility on all major aspects of water resource planning.

2. In addition, a small policy and planning staff would be needed at the departmental level in DNRCD to serve as staff for the inter-departmental Water Resources Council and to help in coordinating DNRCD water management activities with other programs of the Department, including land resources, forestry, fish and wildlife, coastal zone management and recreation. This staff could also serve to relate water resource planning and policy to the overall growth policy and planning of the State administration.

3. Individual water resource program areas--small watersheds, water supply and, especially, water quality--should have adequate planning capabilities to carry out their programs. But these specific planning programs should be closely coordinated with the central water resource planning activity. This is especially necessary for the currently large

water quality planning program. The DNRCD management should give special attention to ensure that these two separate but closely related planning programs become mutually supporting rather than competitive.

Program Content

1. Water resource planning should be viewed as an aid to water resource management, including decision making on broad policy, on programs, on specific projects, and on implementation, including technical help, financial incentives, and regulation. This this end, a program of planning will have several elements.

2. There should be a statewide assessment of water resource supply, problems and demands, conducted every four or five years, to serve as a basis for State water policy and legislation. The current Framework Study contains much information useful for such an assessment.

3. There should be a statewide water resource policy-problem-program alternatives report, which is kept current, to serve primarily as a guide to policy makers. The current Framework Study represents a start toward such a report.

4. There should be intermediate, medium range water and related land use planning studies, undertaken on a sub-state regional basis, by major river basins, coastal zone, and selected metropolitan regions. These planning studies, analogous to the Level B Study now underway for the Yadkin-Pee Dee River Basin, would formulate alternative plans and strategies for water resource management, relying primarily on existing data. An orderly program and schedule for completing such studies for the entire State within ten years should be prepared.

5. In addition, current single-purpose studies either of a statewide nature or covering a limited region or locality would continue. An example of a statewide single-purpose study is the statewide 208 water quality plan; examples of local studies are the Soil Conservation Service-supported small watershed plans, and navigation and local flood control plans of the Army Corps of Engineers.

6. Finally, special planning studies dealing with emerging problems or issues or crisis situations are required. Examples include planning for a statewide flood management program, for a statewide water management program, and for a statewide water conservation program. These studies should be undertaken in advance of crises.

7. The above program of planning activities would not be the responsibility of a single planning unit, but would in many cases be a shared responsibility of several units. Depending on the particular circumstances, the central water resource planning staff should act as the lead agency, the coordinating agency or the convenor agency.

Methodology

1. The central water resource planning staff, the policy staff and the specialist water resource planning staffs in other units should share a common approach to planning based on the scientific method and principles of rationality. Such approach should be goal oriented, multi-objective in nature, and should emphasize application of sound economic principles, systems analysis methods and techniques and the best available methods of environmental analysis.

2. The approach should emphasize the adaptation of these methods and techniques to the specific situations in North Carolina; it should be innovative and should make use of current results of research by maintaining close contact with the research community, especially the N.C. Water Resources Research Institute.

3. The approach should be strongly committed to involving the public in the planning and policy process in realistic and effective ways. It should emphasize the implementation of plans and programs, by organizing planning activities so as to contribute effectively to management, and by including feasibility criteria in evaluating water resource plans and programs.

4. The approach should build strong linkages with other sectors of State government as well as with sub-state regional agencies and local

governments as appropriate, and with the water resource basic data and planning staffs of Federal agencies.

Procedures for Improving Planning

1. The Legislature should give consideration to the recommended improvements in water resource legislation in its next Legislative Session. The DNRCD and the Governor should make specific recommendations for such improvements.

2. The DNRCD should develop specific programs, including estimates of personnel and funds required, for water resource management, flood management, sedimentation control and water conservation, and seek approval of the Governor and the Legislature as soon as feasible.

3. A program of planning activities should be developed, including estimates of personnel and funds required, that would take advantage of the likely availability of increased Federal planning grants; approval of the Governor and the Legislature should be sought as soon as feasible.

4. Reconsideration should be given in 1981, or as soon thereafter as feasible, of the question of reorganization of water resource activities, especially the issue of transfer of functions from the Department of Human Resources to the Department of Natural Resources and Community Development. To this end, a study should be made in early 1981 of the experience with the water resource organizational and management structure established in 1978 and 1979.

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APPENDIX 1

NORTH CAROLINA WATER PLAN--PROGRESS REPORT SERIES: FINAL REPORT ON STATUS

and

NORTH CAROLINA WATER PLAN CONTROL OUTLINE

Source:

N.C. Department of Natural and Economic Resources, Office of Water and Air Resources. North Carolina Water Plan: Progress During FY 1974. Raleigh, N.C., July 1974.

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TABLE A-9

NORTH CAROLINA WATER PLAN - PROGRESS REPORT SERIES

FINAL REPORT OF STATUS

This is a final tabular summary of the Progress Report Series which has been discontinued. The reports are to be used for reference and feeder information, first for the N. C. Framework Water Plan and then as applicable for the standing detailed North Carolina Water Plan.

Part I - Introduction

			Completed or Published
		Introduction and Summary	

Part II - Water Policy, Institutions and Managment

			Completed or Published
Chapter	1	Water Policy & Law (237p)	Feb. 71
		Annex (110p)	Aug. 71
Chapter	2	Economic Data, Objectives and Economic Development (21p)	Aug. 70
Chapter	3	Planning Mechanics and Procedures	
Chapter	4	Management Institutions (154p)	June 72
Chapter	5	Intergovernmental Relationships and Programs (121p)	Mar. 73
Chapter	6	Research (132p)	Dec. 70
		Annex (62p)	Jan. 72
		Second Annex (70p)	June 74
Chapter	7	Emergency Resource Management - Water (574p open file)	Aug. 66

Part III - Functional Aspects of Water Resources Use and Development

			Completed or Published
Chapter	8A	Agriculture and Water - Drainage	
Chapter	8B	Agriculture and Water - Irrigation	
Chapter	8C	Agriculture and Water - Soil Conservation (178p open file-unpub)	Aug. 71
Chapter	9	Aquatic Plant Control	
Chapter	10	Coastal Erosion (223p) (Scheduled)	Aug. 74
Chapter	11	Community and Industrial Water Supplies	
Chapter	12	Conservation and Environmental Considerations	
Chapter	13	Non-Agricultural Drainage and Soil Conservation (189p open file-unpub)	Jan. 74
Chapter	14A	Fish & Wildlife (WRC) (57p)	Oct. 70
Chapter	14B	Fish & Wildlife (C&SF) (11p open file-unpub)	Jan. 71
Chapter	15	Flood Protection & Management	
Chapter	16	Forest Resources, Forestry, and water (128p)	Dec. 73
Chapter	17A	Ground Water	
Chapter	17B	Surface Water	
Chapter	18	Insect Control	
Chapter	19	Power and Water (165p)	Nov. 70
Chapter	20	Deleted	
Chapter	21	Technological Change and Water Resources Development	
Chapter	22	Water Based Recreation (211p)	Oct. 72
Chapter	23	Water Quality	
Chapter	24	Water Transportation & Commerce (87p as Special Report N. C. Navigation Study)	Oct. 68

Part IV - Water Resources Comprehensive Planning Units

			Completed or Published
Chapter	25	The Concept of Basin and Regional Reports in the North Carolina Water Plan (172p)	May 71
Chapter	26	Broad River Basin, Vol. I (116p)	May 73
		- Broad River Basin, Vol. II (151p)	Mar. 74
		- Annex 04 (19p)	June 71
		- Annex 05 (58p)	Dec. 72
Chapter	27	Cape Fear River Basin	
		- Vol. 1 (469p)	Jan. 72
		- Vol. 2 (400p)	Jan. 72
		- Annex 02 (82p)	June 73
		- Annex 05 (23p)	June 71
		- Annex 06 (32 p)	June 71
		- Annex 15 (70p)	June 73
		- Annex 17 (92p)	June 73
Chapter	28	Catawba River Basin	
		- Annex 30 (69p)	Dec. 72
		- Annex 33, 34, 36, 37 (129p)	Nov. 72
		- Annex 35 (21p)	June 73
Chapter	29	Chowan River Basin	
		- Annex 01 (25p)	June 71
		- Annex 03 (20p)	Dec. 72
Chapter	30	French Broad River Basin	
		- Annex 05 (34p)	June 71
Chapter	31	Hiwassee River Basin	
Chapter	32	Little Tennessee River Basin	
		- Annex 02 (53p)	June 72
Chapter	33	Lumber River Basin	
Chapter	34	Neuse River Basin	
		- Special Annex - Falls of the Neuse (200p)	Nov. 73
		- Annex 02 (61p)	Sept. 72
		- Annex 05 (22p)	June 71
		- Annex 07 (67p)	Dec. 72

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Table A (Cont'd.)

Chapter	35	- New River Basin (68p)	Mar. 70
Chapter	36	- Pasquotank River Basin	
Chapter	37	- Roanoke River Basin	
		- Annex 02 (20p)	June 71
		- Annex 10 (54p)	June 73
Chapter	38	- Santee River Basin (Deleted)	
Chapter	39	- Savannah River Basin	
Chapter	40	- Tar-Pamlico River Basin (280p open file-unpub)	Dec. 73
		- Annex 06 and 07 (90p)	June 72
Chapter	41	- Watauga River Basin	
Chapter	42	- White Oak River Basin	
		- Annex 03 (20p)	June 71
Chapter	43	- Yadkin Pee Dee River Basin	
		- Annex 01 (74p)	June 73
		- Annex 02 (60p)	June 72
		- Annex 03 (47p)	June 72
		- Annex 04 (24p)	June 71
		- Annex 15 (48p)	June 72
		- Annex 16 (39p)	June 73
Chapter	44	- The Appalachian Region in North Carolina (184p)	Aug. 70
Appendix	E	- Publications Issued by the Department of Water and Air Resources (58p)	Mar. 71

NOTES

No publications were issued for Part I. In Part II eight separate units were rather widely distributed. One unit was widely distributed in part and retained as open file manuscript in part. In Part III five reports were rather widely distributed and four retained as open file manuscripts. In part IV seven reports were rather widely distributed. The interim water quality annexes were given a very limited distribution. These annexes were prepared jointly by the Planning Division and the Water Quality Division. In all about 6000 pages of text were prepared.

TABLE A-10

North Carolina Water Plan Control Outline

The North Carolina Water Plan is expected to be published in a format consistent with the outline which follows. The Framework Plan scheduled for issuance by January 1, 1976, is to be primarily that part of the plan outlined in Part IV - Area Management Plans.

During the preparation period of the Framework Plan, the Level B Plan, and any other more detailed plans it is proposed to release technical reports for review or for general distribution as appropriate. Scope and distribution will vary widely. The objective is to make available reference information shortly after completion rather to delay any particular topic wating for completion of other material. An example of this type of report is the hydrology section of any particular study. The technical report will be given a suitable title and a code number that will relate it to the section of the North Carolina Water Plan that is most fitting.

Framework reports and more advanced reports that are to be given wide distribution will be designed to be relatively short, readable, and understandable to technical and lay personnel as well. These reports will contain references to available Technical Reports and other reports. Those persons wishing to look for supporting detail to the general distribution reports may visit the Department of Natural and Economic Resources to examine the Technical Reports. If copies are desired it is proposed to make them available, if additional copies are on hand, without charge for official use, or at a nominal charge. In any event copies will be made available at cost if use of a copying machine is required.

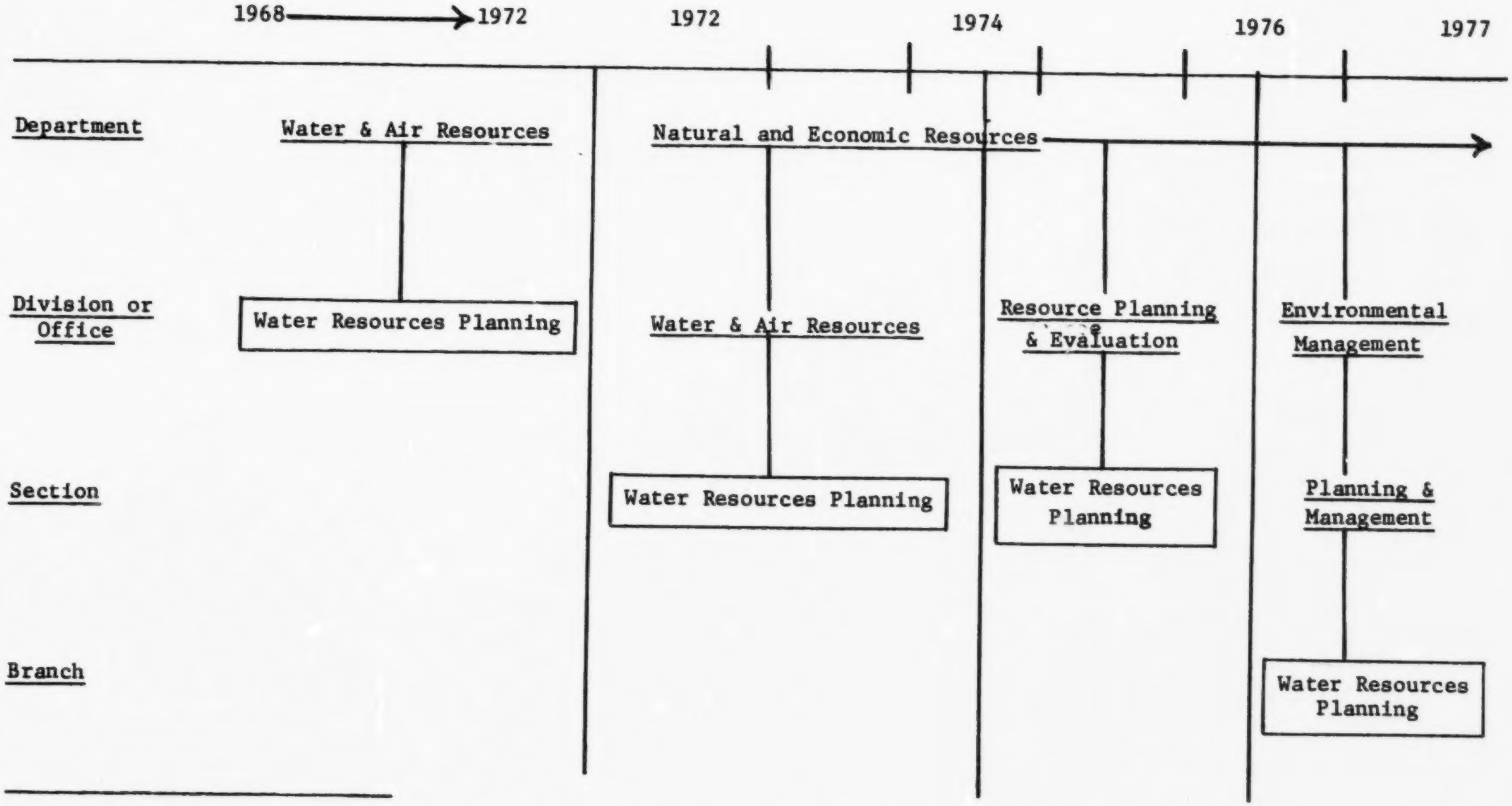
	Code Reference
Part I - Summary Report	I
Part II - Water Policy, Institutions and Management	II
Sec. 1 - Introduction and Summary	II-1
Sec. 2 - Existing Water Law and Policy	II-2
Sec. 3 - State Policy Objectives	II-3
3-A - Economic	II-3-A
3-B - Environmental Quality	II-3-B
3-C - Demographic	II-3-C
Sec. 4 - Management Institutions	II-4
4-A - Federal	II-4-A
4-B - State	II-4-B
4-C - Intra-State	II-4-C
4-D - Intergovernmental	II-4-D
Sec. 5 - Planning and Research	II-5
5-A - Research	II-5-A
5-B - Planning Data Requirements	II-5-B
5-C - Planning Procedure	II-5-C
5-D - Coordination and Public Participation	II-5-D
5-E - Consideration of Technological Change	II-5-E
Sec. 6 - Emergency Resource Management (Water)	II-6
Part III - Functional Elements	III
Sec. 7 - Introduction and Summary	III-7
Sec. 8 - Hydrology of North Carolina	III-8
8-A - Climate	III-8-A
8-B - Surface Water	III-8-B
8-C - Ground Water	III-8-C
8-D - State-Federal Cooperative Programs	III-8-D
Sec. 9 - Water Quality in North Carolina	III-9
Sec. 10 - Soil Conservation, Drainage, and Irrigation	III-10
10-A - Soil Conservation	III-10-A
10-B - Drainage	III-10-B
10-C - Irrigation	III-10-C
Sec. 11 - Domestic, Community and Industrial Water Supply	III-11
Sec. 12 - Flood Protection and Flood Plain Management	III-12
Sec. 13 - Power Production and Water	III-13
Sec. 14 - Fish and Wildlife and Water	III-14
Sec. 15 - Recreation and Water	III-15
Sec. 16 - Forest Resources, Forestry, and Water	III-16
Sec. 17 - Enhancement of Quality of Life	III-17
17-A - Ecosystems of Special Significance	III-17-A
17-B - Preserving Heritage Values	III-17-B
17-C - Abatement of Health and Nuisance Problems (Insect Control, Aquatic Plant Control)	III-17-C

TABLE A-10 (Cont.)

	Code Reference
Part IV - Area Management Plans	IV
Sec. 18 - Introduction and Summary	IV-18
Sec. 19 - Transportation - Waterways and Harbors	IV-19
Sec. 20 - The Coastal Zone of North Carolina	IV-20
20-A - Coastal Erosion	IV-20-A
20-B - Estuarine Areas	IV-20-B
Sec. 21 - The South Atlantic Gulf Region	IV-21
21-A - Introduction and Summary	IV-21-A
21-B - Cape Fear River Basin (0303) New River Basin Northeast Cape Fear River Basin Black and South Rivers Basin Haw and Deep Rivers Basin Coastal Areas	IV-21-B
21-C - Pee Dee River Basin (0304) Yadkin-Pee Dee River Lumber River Waccamaw River	IV-21-C
21-D - Roanoke River Basin (0301) Roanoke River Chowan River Pasquotank River Basin	IV-21-D
21-E - Santee-Edisto River Basin (0305) Broad River Catawba River	IV-21-E
21-F - Savannah-Ogeechee River Basin (0306) Savannah	IV-21-F
21-G - Tar-Neuse River Basin (0302) Tar River Basin Neuse River Basin Coastal Areas	IV-21-G
Sec. 22 - The Ohio River Basin (New-Kanawha)	IV-22
Sec. 23 - The Tennessee River Basin	IV-23
23-A - Introduction and Summary	IV-23-A
23-B - Upper Tennessee River Basin (0601) French Broad River Basin Little Tennessee River Basin Nolichucky River Basin Pigeon River Basin Watauga River Basin	IV-23-B
23-C - Tennessee-Hiwassee-Sequatchie River Basin (0602)	IV-23-C
Sec. 24 - Special Regions (Note: If required. Such as: Appalachian Region, Multi-County Planning Districts, etc.)	IV-24
Part V - Appendix	
App. V-A - Special Tables	V-A
App. V-B - Special Charts	V-B
App. V-C - Reference Lists	V-C
App. V-D - Water Atlas	V-D
App. V-E - Dept. of Natural and Economic Resources Publications - Water and Water Related	V-E

APPENDIX 2

CHANGING ORGANIZATIONAL LOCATION OF THE NORTH CAROLINA STATE WATER RESOURCE PLANNING FUNCTION, 1968-1977


1968
1972
1972
1974
1976
1977
Department
Division or Office
Section
Branch
Water & Air Resources
Water Resources Planning
Natural and Economic Resources
Water & Air Resources
Water Resources Planning
Resource Planning & Evaluation
Water Resources Planning
Environmental Management
Planning & Management
Water Resources Planning

Sources: **N.C. Dept.** of Water and Air Resources, Planning Division, Semi-Annual Report for the Period Ending June 30, 1970.

N.C. Dept. of Natural and Economic Resources, "The State of Water Resource Management in North Carolina," March 1972.

N.C. Dept. of Natural and Economic Resources, North Carolina Water Plan: Progress During FY 1974, July 1974.

N.C. Dept. of Natural Resources and Community Development, Division of Environmental Management, Annual Report on Programs Related to Title III of the Water Resources Planning Act, State Fiscal Year 1977, August 1977.